

BROOKLYN BOTANIC GARDEN

PLANTS
&
GARDENS

PLANTS & GARDENS

SPRING
1954

Vines
for Every
Purpose

How and
Where to
Use Them

NEW SERIES

VOL. 10

No. 1



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Editorial

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McFarland

Climbing roses lend quaint charm to homes of almost any style.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES
BROOKLYN BOTANIC GARDEN
1000 WASHINGTON AVENUE
BROOKLYN 25, NEW YORK
TELEPHONE: MAIN 2-4433

Spring 1954

An enterprising nurseryman will some day advertise in every available medium:

WANTED - Ten new and different ways to
use vines effectively in planting the
home grounds.

His ad will strike the fancy of an imaginative amateur gardener or horticulturist, ideas will be forthcoming, and vines will be off to a new period of popularity. The same enterprising nurseryman will be able to supply 50 or 100 different kinds, for a multitude of uses. They will not be limited to growing on pergolas, trellises or fences, or merely for the easy disguise of architectural anomalies or excesses such as unsightly porches and over-extensive wall areas.

Make no mistake, vines have a place in ornamental architecture. Grow them on the ground and they are ground covers; grow them upright in their natural way and they make a vertical garden of foliage and blooms that needs weeding only at the lower edge.

In short, vines present horticultural opportunities that for the moment are not adequately recognized. The dearth of varieties offered in the average nurseryman's catalog confirms this view. This is why we asked Guest Editor Wyman to invite a carefully selected group of authors to give us the facts about vines. His own interest in climbers and twiners has done much to promote an increased appreciation of these plants during the past few years. And now, in this Handbook, readers will find 150 kinds of vines described or mentioned. Some are hardy only in the deep South, or in California; others can be grown almost anywhere. Certain types are outstanding as flowering or fruiting ornamentals; others are best used as ground covers. Each has a place where it can add materially to the beauty or utility of one's surroundings. A little study and thought before planting will save much unnecessary work afterward.

Sincerely,

A handwritten signature in cursive script, reading "George S. Remy, Jr." The signature is written in dark ink and is positioned centrally below the word "Sincerely,".

Director



Flowers of Chinese
wisteria.

Roche

VINES FOR EVERY PURPOSE

Select the right one whether for showy flowers, colorful fruits, or fine foliage—and for special situations

Donald Wyman

VINES should be selected with great care! One should study vines and select the right one for each special situation. It will be most helpful to go through catalogues, to visit nurserymen or botanic gardens, for often the common popular one is not the best. In order to help amateurs select the right type, the following lists will be useful.

Each of the over one hundred vines is described in more or less detail in at least one of the articles in this issue of **PLANTS & GARDENS** and some are mentioned several times. This is not a list of "the best" vines, for almost every one of them has its limitations; but nevertheless the list should be an aid in the search for just the right vine.

For Flowers

There are many of these, both slow and fast growing. Some, like the wisterias, fail to flower satisfactorily under certain conditions; and others, like the clematis clan, require special care and soil in order to produce a profusion of flowers. On the other hand, the fleece vine and the trumpet creeper will grow well under many different conditions, and so, naturally are among those that are frequently seen. Some of the others are decidedly worth trying in order to produce good flowers, and a close study of the articles in this issue will aid materially in this respect. Flowering periods vary from place to place. The dates given here are for northeastern United States except the ones for vines that grow only in warm climates, marked (W).

Common name	Scientific name	Time of blooming	See page
MORE OR LESS CONTINUOUSLY IN WARM CLIMATES			
Mountain rose coral vine	<i>Antigonon leptopus</i>	Continuously	11,33
Glorybower	<i>Clerodendron speciosum</i>	Continuously	39
Bleeding-heart glorybower	<i>Clerodendron thomsonae</i>	Continuously	39
Finger-leaf morning-glory	<i>Ipomoea digitata</i>	Continuously	33
Passion flower	<i>Passiflora incarnata</i>	Continuously	37,38,49
Mexican blood trumpet vine	<i>Phacodranthus buccinatorius</i>	May-Sept. or all year in some places	50
Jasmine nightshade	<i>Solanum jasminoides</i>	Continuously	37
SPRING AND EARLY SUMMER			
Anemone clematis	<i>Clematis montana</i>	May-June	16,17
Pink clematis	<i>Clematis montana rubens</i>	May-June	16,17
Yellow honeysuckle	<i>Lonicera flara</i>	May-June	42
Cherokee rose	<i>Rosa laevigata</i>	May	35
Rambler rose		June	12
Chinese star-jasmine	<i>Trachelospermum jasminoides</i>	April-July (W)	37
Japanese wisteria	<i>Wisteria floribunda</i>	May	20,21,22
Long-cluster Japanese wisteria	<i>Wisteria floribunda macrobotrys</i>	May	20,21,22
Pink Japanese wisteria	<i>Wisteria floribunda rosea</i>	May	20,21,22
Evergreen wisteria	<i>Wisteria megasperma</i>	May-June (W)	37
Chinese wisteria	<i>Wisteria sinensis</i>	May	20,22,66
SUMMER			
Trumpet creeper	<i>Campsis radicans</i>	mid-July-Sept.	20,33,55
Curly clematis	<i>Clematis crispa</i>	June-Aug.	44
Stanavoi clematis	<i>Clematis fusca</i>	June-Aug.	44
Jackman clematis	<i>Clematis jackmani</i>	mid-July	16,44
Henry clematis	<i>Clematis lawsoniana henryi</i>	June-Aug.	44
Italian clematis	<i>Clematis viticella</i>	June-Aug.	15,45
Kermes clematis	<i>Clematis viticella kermesina</i>	June-Aug.	44
Climbing hydrangea	<i>Hydrangea petiolaris</i>	June-July	18,40,43,54,55
Everblooming honeysuckle	<i>Lonicera heckrottii</i>	June-Sept.	42
Henry honeysuckle	<i>Lonicera henryi</i>	June-Aug.	59



The cup-and-saucer vine
(*Cobaea scandens*).

McFarland

(For Flowers, continued)

Common name	Scientific name	Time of blooming	See page
Hall's Japanese honeysuckle	<i>Lonicera japonica halliana</i>	June-Sept.	49,59
English woodbine honeysuckle	<i>Lonicera periclymenum</i>	June-Aug.	41
Trumpet honeysuckle	<i>Lonicera sempervirens</i>	May-Aug.	18,41
Tellmann honeysuckle	<i>Lonicera tellmanniana</i>	June-Sept.	42
Chinese honeysuckle	<i>Lonicera tragophylla</i>	June	42
Blue crown passion flower	<i>Passiflora caerulea</i>	June-Sept. (W)	37,38,49
Bengal clock vine	<i>Thunbergia grandiflora</i>	midsummer (W)	39
Regel's threewingnut	<i>Tripterygium regeli</i>	July	41,43
LATE SUMMER AND FALL			
October clematis	<i>Clematis apiifolia</i>	Sept.-Oct.	44
Jouin clematis	<i>Clematis jouiniana</i>	Aug.-Oct.	45
Western virgin's bower	<i>Clematis ligusticifolia</i>	Aug.-Sept.	44
Sweet autumn clematis	<i>Clematis paniculata</i>	Sept.-Oct.	17,44
Scarlet clematis	<i>Clematis texensis</i>	July-Sept.	18,44
Virgin's bower	<i>Clematis virginiana</i>	Aug.-Sept.	17
Purple-bell cobaea	<i>Cobaea scandens</i>	July-frost	49,77
Tanglehead	<i>Pileostegia viburnoides</i>	late Aug-Sept. (W)	49
Silver fleece vine	<i>Polygonum auberti</i>	Aug.-Sept.	20
Memorial rose	<i>Rosa wichuraiana</i>	Aug.-Sept.	61
Costa Rican nightshade	<i>Solanum wendlandi</i>	July-Oct. (W)	37

With Colorful Fruits

Common name	Scientific name	Time Fruit is Colorful	See page
Amur ampelopsis	<i>Ampelopsis brevipedunculata</i>	fall	41
Oriental bittersweet	<i>Celastrus orbiculata</i>	fall-winter	49
American bittersweet	<i>Celastrus scandens</i>	fall-winter	59
Clematis	<i>Clematis</i> —most species	summer-fall	16, 17, 18, 44, 45
Big-leaf wintercreeper or evergreen bittersweet	<i>Euonymus fortunei vegeta</i>	fall	47, 52, 61
Running euonymus	<i>Euonymus obovata</i>	fall	60
Scarlet kadsura	<i>Kadsura japonica</i>	fall	49
	<i>Parthenocissus</i> species	fall	54, 55, 58, 61, 64
Angle-twist magnolia-vine	<i>Schisandra propinqua</i>	fall	49

Roche

Feathery fruits of clematis.



Rapid Growing

If one wishes a vine rather than a shrub or a tree to cover some unsightly obstacle quickly or to provide a screen in a short time, these are the vines for this purpose. They are all fairly dense in habit and any one of them can be made denser merely by a little pruning. In this group will be found clinging vines as well as those that twine.

Common Name	Scientific Name	See page
Bower actinidia	<i>Actinidia arguta</i>	69,74,75
Chinese gooseberry	<i>Actinidia chinensis</i>	74,75
Kolomikta actinidia	<i>Actinidia kolomikta</i>	74,75
Silvertine actinidia	<i>Actinidia polygama</i>	74,75
Five-leaf akebia	<i>Akebia quinata</i>	31,59
Pepper vine	<i>Ampelopsis arborea</i>	62
Amur ampelopsis	<i>Ampelopsis brevipedunculata</i>	41
Mountain rose coral vine	<i>Antigonon leptopus</i>	11,33
Common Dutchman's pipe	<i>Aristolochia durior</i>	24,40
Cross vine	<i>Bignonia capreolata</i>	33,34
Trumpet creeper	<i>Campsis radicans</i>	20, 33, 55
Oriental bittersweet	<i>Celastrus orbiculata</i>	49
American bittersweet	<i>Celastrus scandens</i>	59
Anemone clematis	<i>Clematis montana</i>	16,17
Sweet autumn clematis	<i>Clematis paniculata</i>	17,44
Scarlet clematis	<i>Clematis texensis</i>	18,44
Virgin's bower	<i>Clematis virginiana</i>	44
Travelers' joy	<i>Clematis vitalba</i>	44
Italian clematis	<i>Clematis viticella</i>	44
Purple-bell cobaea	<i>Cobaea scandens</i>	49,77
Catclaw funnel creeper	<i>Doranthla unguis-cati</i>	33,49,66
Creeping fig	<i>Ficus pumila</i>	36,50
English ivy	<i>Hedera helix</i>	25,46,52,53
Hall's Japanese honeysuckle	<i>Lonicera japonica halliana</i>	49,59
Trumpet honeysuckle	<i>Lonicera sempervirens</i>	18,41
Common moonseed	<i>Menispermum canadense</i>	59
Common wire vine	<i>Muehlenbeckia complexa</i>	62
Virginia creeper	<i>Parthenocissus quinquefolia</i>	55,58,61
Japanese creeper	<i>Parthenocissus tricuspidata</i>	54
Passion flowers	<i>Passiflora species</i>	37,38,49
Mexican blood trumpet vine	<i>Phaedranthus buccinatorius</i>	50
Silver fleece vine	<i>Polygonum auberti</i>	20
Kudzu vine	<i>Pueraria thunbergiana</i>	37
Chinese star-jasmine	<i>Trachelospermum jasminoides</i>	37
Glory-vine grape	<i>Vitis coignetiae</i>	72
Japanese wisteria	<i>Wisteria floribunda</i>	20,21,22
Evergreen wisteria	<i>Wisteria megasperma</i>	37
Chinese wisteria	<i>Wisteria sinensis</i>	20,22,66

Open Growing

The following vines should not be selected for a screen. They do not make a dense mass of foliage, but they do have merit in adding the beauty of foliage outline to the interesting architectural features of a trellis or lattice work.

Common Name	Scientific Name	See page
Amur ampelopsis	<i>Ampelopsis brevipedunculata</i>	41
Curly clematis	<i>Clematis erispa</i>	44
Jackman clematis	<i>Clematis jackmani</i>	16,44
Jouin clematis	<i>Clematis jouiniana</i>	45
Western virgin's bower	<i>Clematis ligusticifolia</i>	44
Golden clematis	<i>Clematis tangutica obtusiuscula</i>	45
Kermes clematis	<i>Clematis viticella kermesina</i>	44
Yellow honeysuckle	<i>Lonicera flava</i>	42
Everblooming honeysuckle	<i>Lonicera heekrotti</i>	42
English woodbine honeysuckle	<i>Lonicera periclymenum</i>	41
Trumpet honeysuckle	<i>Lonicera sempervirens</i>	18, 41
Tellmann honeysuckle	<i>Lonicera tellmanniana</i>	42
Chinese honeysuckle	<i>Lonicera tragophylla</i>	42
Firecracker vine	<i>Manettia glabra</i>	35
Virginia creeper	<i>Parthenocissus quinquefolia</i>	55,58,61
Cherokee rose	<i>Rosa laevigata</i>	35

Twining Vines

The following are selected for twining up a rainspout, a wire, or for use on lattice work or on chain-link fences. Once given a good start they will take care of themselves, but some of them may grow so vigorously that they will have to be headed back from time to time. If the fence abuts the sidewalk, the long runners of bittersweet vines, for instance, can become a hazard to pedestrians. In such a case a close-clinging vine such as the fleece vine or the Virginia creeper would be better.

Common Name	Scientific Name	See page
Actinidias	<i>Actinidia species</i>	75
Five-leaf akebia	<i>Akebia quinata</i>	31,59
Common Dutchman's pipe	<i>Aristolochia durior</i>	24,40
Bittersweets	<i>Celastrus species</i>	49,59
Carolina jessamine	<i>Gelsemium sempervirens</i>	34
Finger-leaf morning-glory	<i>Ipomoea digitata</i>	33
Scarlet kadsura	<i>Kadsura japonica</i>	49
Honeysuckles	<i>Lonicera species</i>	41,42
Common moonseed	<i>Menispermum canadense</i>	59
Common wire vine	<i>Muhlenbeckia complexa</i>	62
Silk vines	<i>Periploea species</i>	25
Silver fleece vine	<i>Polygonum auberti</i>	20
Kudzu vine	<i>Pueraria thunbergiana</i>	37
Chinese magnolia-vine	<i>Schisandra chinensis</i>	25
Angle-twist magnolia-vine	<i>Schisandra propinqua</i>	49
Chinese star-jasmine	<i>Trachelospermum jasminoides</i>	37
Regel's threewingnut	<i>Tripterygium regeli</i>	41,43
Wisterias	<i>Wisteria species</i>	20,22



McFarland

Common wintercreeper, like other self-supporting vines, is best used on stone or brick walls.

Self-supporting by Rootlets, Holdfasts, or Tendrils with Discs

These vines will cling to anything, and it is from this list that one should select the vines for covering stone or brick work. Some grow more rampant than others, some are evergreen and some are deciduous. None of them need be held to the building by man-made means of support.

Common Name	Scientific Name	See page
Trumpet creeper	<i>Campsis radicans</i>	20,33,55
Catclaw funnel creeper or catclaw vine	<i>Dorcantha unguis-cati</i>	33,49,66
Wintercreeper	<i>Euonymus fortunei</i>	47
Glossy wintercreeper	<i>Euonymus fortunei carrierei</i>	48
	<i>Euonymus fortunei gracilis</i>	48
Kew euonymus	<i>Euonymus fortunei kewensis</i>	48
Baby wintercreeper	<i>Euonymus fortunei minima</i>	48,52
Common wintercreeper	<i>Euonymus fortunei radicans</i>	52
Creeping fig	<i>Ficus pumila</i>	36,50
English ivy	<i>Hedera helix</i>	25,46,52,53
Gold-leaf ivy	<i>Hedera helix aureo-variegata</i>	47
Baltic ivy	<i>Hedera helix baltica</i>	43,47
Bunch-leaf ivy	<i>Hedera helix conglomerata</i>	47
Finger-leaf ivy	<i>Hedera helix digitata</i>	47
Small-leaf ivy	<i>Hedera helix minima</i>	47
Climbing hydrangea	<i>Hydrangea petiolaris</i>	18,40,43,54,55
St. Paul Virginia creeper	<i>Parthenocissus quinquefolia saint-pauli</i>	55
Japanese creeper or Boston-ivy	<i>Parthenocissus tricuspidata</i>	54
Low's Japanese creeper	<i>Parthenocissus tricuspidata lowi</i>	54,64
Veitch's Japanese creeper	<i>Parthenocissus tricuspidata veitchi</i>	54
Mexican blood trumpet vine	<i>Phaedranthus buccinatorius</i>	50
Tanglehead	<i>Pileostegia viburnoides</i>	49
Japanese hydrangea-vine	<i>Schizophragma hydrangeoides</i>	43,55

Clinging by Means of Tendrils

These too can be used on lattice work and on chain-link fences; but they are not too satisfactory on single-wire supports, for they need something horizontal around which they can fasten their tendrils. The grapes are so vigorous that they are grown on horizontal wires in vineyards, but the home gardener frequently finds that he must assist them a bit during the growing season in order to guide vigorously growing shoots.

Common Name	Scientific Name	See page
Ampelopsis	<i>Ampelopsis</i> species	41,62
Mountain rose coral vine	<i>Antigonon leptopus</i>	11,33
Cross vine	<i>Bignonia capreolata</i>	33,34
Clematis	<i>Clematis</i> species (tendrils in the form of modified leaf stalks)	16,17,18,44,45
Purple-bell cobaea or cup-and-saucer vine	<i>Cobaea scandens</i>	49,77
Catclaw funnel creeper	<i>Doranthus unguis-cati</i>	33,49,66
Silver-vein creeper	<i>Parthenocissus henryana</i>	62
Virginia creeper	<i>Parthenocissus quinquefolia</i>	55,58,61
Engelmann Virginia creeper	<i>Parthenocissus quinquefolia engelmanni</i>	41
Passion flowers	<i>Passiflora</i> species	37,38,39
Silver fleece vine	<i>Polygonum nuberti</i> (modified leaf stalks)	20
Summer grape	<i>Vitis nestivalis</i>	72
Sweet winter grape	<i>Vitis vinera</i>	72
Glory-vine grape	<i>Vitis coignetiae</i>	72
Doan grape	<i>Vitis doaniana</i>	72
Fox grape	<i>Vitis labrusca</i>	72
Riverbank grape	<i>Vitis riparia</i>	72
Thunberg grape	<i>Vitis thunbergi</i>	41
European grape	<i>Vitis vinifera</i>	73
Frost grape	<i>Vitis vulpina</i>	72

McFarland

Mountain rose coral vine clings by its numerous tendrils.



For Banks

Occasionally there are banks to steep for grass to be grown properly, and possibly too difficult or not important enough to plant to special ground covers. The vines in this list are the ones that can be expected to ramble over such banks, covering the soil and any rocks or holes that are present. As is stated in the accompanying articles, *Akebia quinata* and Hall's honeysuckle are so vigorous that they can get out of control and become serious pests, while *Euonymus obovata* is much slower in growth and is easily restrained. Usually English ivy is easily controlled, certainly in the North, but in the South it can become a rampant spreader. So, select from among the plants in this list with care, realizing in advance that it would probably be best to plant slow-spreading ground covers (pages 13 and 58) on the short bank and reserve the vines in this list for the very steep bank or the bank with poor sandy soil or the bank where anything is desirable that will cover the ground. It should also be pointed out that the memorial rose and Hall's honeysuckle are both excellent for their habit of rooting along their stems where they may touch moist soil, and so these aid materially in preventing soil erosion.

Common Name	Scientific Name	See page
Akebia	<i>Akebia</i> species	31,59
October clematis	<i>Clematis apūifolia</i>	44
Sweet autumn clematis	<i>Clematis paniculata</i>	17,44
Travelers' joy	<i>Clematis vitalba</i>	44
Italian clematis	<i>Clematis viticella</i>	44
Big-leaf wintercreeper	<i>Euonymus fortunei vegeta</i>	47,52,61
Running euonymus	<i>Euonymus obovata</i>	60
English ivy	<i>Hedera helix</i>	25, 46, 52, 53
Hall's Japanese honeysuckle	<i>Lonicera japonica halliana</i>	49,59
Common moonseed	<i>Menispermum canadense</i>	59
Virginia creeper	<i>Parthenocissus quinquefolia</i>	55,58,61
Kudzu vine	<i>Pueraria thunbergiana</i>	37
Rambler rose		20, 61
Memorial rose	<i>Rosa wichuraiana</i>	61
Grapes	<i>Vitis</i> species	72,73,74

McFarland



Rambler roses make a useful and beautiful cover for a bank.

Ground Covers

Several vines can be used as ground covers (see page 58). Most of them are not neat in doing this and will quickly climb any shrub or tree near by. Although this may not be harmful, there are some situations where it is not desirable. Some, like *Vinea minor* and *Hedera helix*, will require little attention, and others, like the bittersweets, may quickly grow out of bounds and require a considerable amount of care to keep restrained. Therefore, vines as ground covers should be selected only after careful study of the situation.

Common Name	Scientific Name	See page
Five-leaf akebia	<i>Akebia quinata</i>	31,59
Pepper vine	<i>Ampelopsis arborea</i>	62
Bittersweets	<i>Celastrus species</i>	49,59
Winterereepers	<i>Euonymus fortunei</i> vars.	47,48,52
Running euonymus	<i>Euonymus obovata</i>	60
English ivy	<i>Hedera helix</i> vars.	25,46,47,52,53
Henry honeysuckle	<i>Lonicera henryi</i>	59
Hall's Japanese honeysuckle	<i>Lonicera japonica halliana</i>	49,59
Common moonseed	<i>Menispermum canadense</i>	59
Common wire vine	<i>Muehlenbeckia complexa</i>	62
Silver-vein creeper	<i>Parthenocissus henryana</i>	62
Virginia creeper	<i>Parthenocissus quinquefolia</i>	55,58,61
Engelmann Virginia creeper	<i>Parthenocissus quinquefolia engelmanni</i>	41
St. Paul Virginia creeper	<i>Parthenocissus quinquefolia saint-pauli</i>	55
Kudzu vine	<i>Pueraria thunbergiana</i>	37
Memorial rose	<i>Rosa wichuraiana</i>	61
Big-leaf periwinkle	<i>Vinea major</i>	62
Common periwinkle	<i>Vinea minor</i>	61

Withstanding Shade

Many plants do not grow nearly as well in the shade as they do in the full sun, and some are not even worth trying under such conditions. The following are the vines that should be considered for shady places since they can be expected to do better than most.

Common Name	Scientific Name	See page
Actinidias	<i>Actinidia species</i>	75
Five-leaf akebia	<i>Akebia quinata</i>	31,59
Common Dutchman's pipe	<i>Aristolochia durior</i>	24,40
Clematis	<i>Clematis species</i>	16,17,18,44,45
Winterereepers	<i>Euonymus fortunei</i> vars.	47,48,52
Running euonymus	<i>Euonymus obovata</i>	60
Carolina jessamine	<i>Gelsemium sempervirens</i>	34
English ivy	<i>Hedera helix</i> vars.	25,46,52,53
Climbing hydrangea	<i>Hydrangea petiolaris</i>	18,40,43,54,55
Honeysuckles	<i>Lonicera species</i>	41,42,49,59

(Withstanding Shade, continued)

Common name	Scientific name	See page
Common moonseed	<i>Menispermum canadense</i>	59
	<i>Parthenocissus</i> species	54, 55, 58, 61, 64
Tanglehead	<i>Pileostegia viburnoides</i>	49
Japanese hydrangea-vine	<i>Schizophragma hydrangeoides</i>	43, 55
Bengal clock vine	<i>Thunbergia grandiflora</i>	39
Chinese star-jasmine	<i>Trachelospermum jasminoides</i>	37
Grapes	<i>Vitis</i> species	41, 72, 73, 74

Withstanding Moist to Wet Soil

The wetter the soil, the more difficult it is to find plants that will grow. These are among the vines to be considered for a moist situation. If they do not grow well, there are probably none that will.

Common Name	Scientific Name	page
Trumpet creeper	<i>Campsis radicans</i>	20, 33, 55
Virgin's bower	<i>Clematis virginiana</i>	17
Common moonseed	<i>Menispermum canadense</i>	59
Chinese star-jasmine	<i>Trachelospermum jasminoides</i>	37

Withstanding Dry Soil

When the soil is very dry, there are only a few plants that will grow in it. When dry soil conditions are a problem, everything possible should be done to mix humus materials with the soil and to mulch the plants as well, in order that every bit of moisture be conserved. These are the vines that should be considered for such trying situations.

Common Name	Scientific Name	page
Pepper vine	<i>Ampelopsis arborea</i>	62
Trumpet creeper	<i>Campsis radicans</i>	20, 33, 55
October clematis	<i>Clematis apiifolia</i>	44
Scarlet clematis	<i>Clematis texensis</i>	18, 44
Virgin's bower	<i>Clematis virginiana</i>	17
Creeping fig	<i>Ficus pumila</i>	36, 50
Trumpet honeysuckle	<i>Lonicera sempervirens</i>	18, 41
Virginia creeper	<i>Parthenocissus quinquefolia</i>	55, 58, 61
Japanese creeper	<i>Parthenocissus tricuspidata</i>	54
Silver fleece vine	<i>Polygonum auberti</i>	20
Kudzu vine	<i>Pueraria thunbergiana</i>	37

Large-flowered clematis (*Clematis lawsoniana henryi*).



Roche

VINES WITH SHOWY FLOWERS

With points on their culture and special uses

Harold O. Perkins

VINES in full flower can be highly dramatic, presenting a large surface to the viewer but taking up little land area. Since they generally grow on a flat surface, a maximum amount of flowering wood is exposed to full light and is thus able to form flower buds.

There is a wide variety of colors, flower shapes, and foliage types to select from. Although this article centers its attention on the flowers, we should not overlook the appearance of the all-important foliage and the general habit and neatness of the vine.



McFarland

Pink anemone clematis (*Clematis montana rubens*), appropriately used to overhang a wall.

Clematis

Just the mention of the word "clematis" brings a varied color pattern to one's mind. This group of vines has a wide range of color and furthermore there is a surprising variation in the shape of the flowers. Clematis has become a specialized group of plants, a few nurseries devoting all of their attention to this one genus.

The large-flowered clematis hybrids are truly spectacular and have been receiving more attention from the garden public in recent years. The four or more sepals usually open flat and give a saucer-like effect. Flowers 5 to 6 inches in diameter are common, yet they never appear gaudy. For the most part, the colors are soft.

Large-flowered hybrid clematis

violet-purple
 Jackman's
 lavender-blue
 RAMONA
 pale mauve to white
 NELLY MOSER
 white
 Henry's
 DUCHESS OF EDINBURGH
 (semi-double)
 red
 MME. EDOUARD ANDRÉ
 VILLE DE LYON

Most of these kinds of clematis start to flower in early June or July and the flowers are very effective for two or three weeks. They hold up well as cut flowers. These vines grow only about 8 or 10 feet long and so are not overpowering as many vines are. They can be grown on a wall if given some means by which they can climb, or on a fence or lattice. The base of the vine should be in partial shade, but the flowering portion should be in almost full sun. The stems of clematis are quite easily broken, so the bases of the plants should be protected from pets. Since the plants are shallow-rooted, mulching is better than cultivation. A fairly rich, non-acid soil is necessary to attain good growth.

Pink anemone clematis (*C. montana rubens*) is vigorous and grows about 25 feet long. The pink flowers, appearing in May, are 2 inches across and are very numerous. Because of its great vigor,

this clematis is easier to grow than the large-flowered hybrids.

Sweet autumn clematis (*C. paniculata*) is the "old reliable" of the clematis clan. It is the easiest one to grow and has been widely planted. Quite unlike the others that have been described, it flowers in September and has loose panicles of small, white, pleasantly fragrant florets. These are followed by plummy seed pods typical of all kinds of clematis, many of which are quite decorative. They can be used with other flowers to make most interesting bouquets. The semi-evergreen foliage of this species is dark green and glossy—the best foliage to be found in the entire group. Sweet autumn clematis is somewhat like the native **virgin's bower** (*C. virginiana*), although it is far superior in all respects. Virgin's bower is not showy in flower and is hardly noticed until fall when its very plummy seed pods are seen along our roadsides.

Sweet autumn clematis is easiest of all to grow.

McFarland





Scarlet clematis.

McFarland



Silver lace vine.

Roche

Scarlet clematis (*C. terensis*) has bell- or jug-shaped flowers of bright scarlet. The vine eventually covers an area 6 to 10 feet square. It needs full sun and apparently grows better in the naturally sweet soils of the Midwest than it does in the acid soils of New England.

Honeysuckle

Hall's honeysuckle (*Lonicera japonica halliana*) is a vigorous vine growing about 30 feet long. The white flowers, turning a creamy color as they age, are like tiny trumpets. The plant starts to produce its pleasingly fragrant flowers in early June and scattered flowers can be found into late autumn. The foliage is dark green and is semi-evergreen. Numerous stems are developed, and with the naturally thick foliage the plant may produce too heavy an effect when used as a vine on some trellises. Hall's honeysuckle is commonly used as a ground cover.

Trumpet honeysuckle (*L. sempervirens*) has trumpet-shaped flowers about 2 inches long. They are scarlet with yellow-orange throats, and have no fragrance. The end pair of leaves are joined together so that the stem appears to pierce the leaf. Aphids are a troublesome pest and often cause the leaves of this plant to roll; this makes it difficult to control them by spraying. This vine may reach a height of 30 feet, but it does not form a dense plant as does Hall's honeysuckle.

Climbing Hydrangea

Climbing hydrangea (*H. petiolaris*) is a unique vine, and until it flowers one would have to be very keen indeed to guess that it might be a close kin of one of our common shrubs. This vine is most uncommon and probably will always remain so because it has limited use. It needs a large masonry wall surface since it is a vigorous plant sometimes attaining a height of 50 feet, and it clings by root-like holdfasts which are destructive to wooden structures. However, it can be grown on tree trunks. The white flowers form flat clusters and do not present the overstuffed appearance that many people

associate with hydrangea. The heart-shaped leaves are lustrous green and have a substance and quality that are far superior to those of the commoner relatives of this plant. The flower heads measure 6 or more inches across and project out from the wall a foot or more. The foliage also projects outward so that it presents more depth than a close-clinging vine such as Boston-ivy. Climbing hydrangea requires good soil and a little attention in the first few years after planting. Later it becomes a rather free-growing vine.

Climbing Roses

Climbing roses are a special topic unto themselves and are normally used more as garden flowers than are the vines under discussion here. For this reason, little will be said about this group of plants. DR. W. VAN FLEET is one of the most dependable of the climbing roses. It has dark green foliage of good substance and rarely has to be sprayed. Even the Japanese beetles seem to keep away from this plant. The flower is a delicate pink; it is fully double and is of the large-flowered type.

Climbing Roses

scarlet

BLAZE (semi-double)

PAUL'S SCARLET (semi-double)

maroon

DR. HUEY (semi-double)

pink

DR. W. VAN FLEET (double)

white

SILVER MOON (semi-double)

yellow

DOUBLOONS (double)



Roche

Blossoms of the climbing rose SILVER MOON.

Trumpet vine.

Roche



Climbing roses are better when used on a fence than on a lattice near the house. For the most part, they require a considerable amount of spraying, and when they are out of flower, they may appear unattractive because of their rather stiff stems growing off at odd angles away

from the house. The small-flowered Rambler rose is little planted today except in a few limited areas where it will grow well. Ramblers are subject to mildew, and as the old flowers fade they become unattractive.

Silver Fleece Vine

Silver fleece vine, or silver lace vine (*Polygonum auberti*) has small greenish-white flowers, produced in large masses which are rather attractive from a distance, but scarcely bear close inspection. It blooms in August. The foliage is never very attractive, and after being perforated by insects it looks weedy. Silver fleece vine is related to buckwheat.

Trumpet Vine

Trumpet vine (*Campsis radicans*) is a rampant native American vine that quickly grows to 30 feet. Its dark green compound leaves present a tropical or bold appearance. The trumpet-shaped flowers appear in mid-July. Orange to orange-scarlet in color, they are 2 inches across at the bell end and 3 inches long. This vine has some root-like holdfasts so it must be watched if it is used on a wooden structure. Because of its vigor and generally rampant growth, it is little used except on fence posts. This plant is late to leaf out in the spring and so appears dead at a time when we are very conscious of fresh new growth in most plants.

Wisteria

Chinese wisteria (*W. sinensis*) is the commonly used wisteria of our American gardens. It is a twining vine growing to 50 feet. Since it has extreme vigor and completely overpowers a delicate lattice it is suitable for few wooden structures. It is at its best on a large masonry building, especially when it can be trained horizontally on a wire that is some 10 to 20 feet above the ground. Wisteria is sometimes trained as a standard or in tree form. The trunk of such a plant is unbranched to a height of 4 to 6 feet, topped by a roughly globe-shaped mass of foliage. When it flowers, it presents a pleasing spot of color. It is far less formal

than are other plants treated as standards. It takes a number of years to produce such a plant since the main stem must develop to a considerable size and be of trunk-like structure. The plant must be staked, of course, and the top must be pruned several times a year.

The flower of the common wisteria is blue-violet in color and the dense pendulous racemes are most pleasing. Their naturally graceful lines appear even finer when the vine is trained out over a large pool where the reflections present a beauty all their own. Designers in the Orient often do this.

Wisteria flowers in late May before the leaves unfold so we can enjoy their flowers to the fullest. The plant is rather late in leafing out, but since the flowers fill in until the leaves appear, we are not conscious of this fact. The compound leaf, made up of seven to thirteen leaflets, is decorative and makes an interesting shadow pattern. There is a white-flowering form which is seldom seen, but which is most attractive when used on a brick structure or against a dark wooden background.

The Japanese wisteria (*W. floribunda*) is not at all common in our gardens. The flower cluster of this species is longer and less dense than that of Chinese wisteria. The open space between the flowers presents a more graceful effect. There is a wide range of bluish-purple shades in this species and it is possible to purchase several named varieties.

Vines have not been as widely planted recently as they were some thirty years ago. Possibly there are fewer porches. However, porches are now on the increase even though this increase may be slight. Fences have been making a real comeback in the last ten years and this marked trend will undoubtedly result in a renewed use of vines. We must bear in mind that vines may overgrow the area for which they are intended so we should be familiar with their growth habits as well as with their flowers. Flowering vines present a versatile group of plants and when properly used help create more pleasing landscape pictures.



Courtesy Arnold Arboretum

Japanese wisteria deserves to be more widely used.

CHINESE VS. JAPANESE WISTERIA

When wisteria is mentioned, most people think of the short-clustered Chinese wisteria (*W. sinensis*), which is widely planted throughout the country, while only a few consider the hardier Japanese wisteria (*W. floribunda*). Both have been in America about a century, but the Chinese plant has proved more popular. The flower clusters are about 7 to 14 inches long and the individual flowers open all at once, making a beautiful display. The clusters of the Japanese vine may be 8 to 52 inches long (depending on the variety and the soil and moisture conditions where they are growing) and the individual flowers do not all open at once. Instead, the flowers begin to open at the base of the cluster and open progressively to the tip, so that usually not all the flowers in a cluster are in good condition at one time.

However, the Japanese vine makes up for this in having some varieties (such as *W. floribunda macrobotrys*) with clusters over 4 feet long. We have actually measured some at the Arnold Arboretum and found them to be 36 inches long. Then, too, the Japanese plant is hardier and has many varieties in the trade, one with pink flowers (*W. floribunda rosea*) and several with white flowers; still others have flowers varying slightly in size and color. The Japanese varieties can usually be distinguished from the Chinese kind in that they have thirteen to nineteen leaflets, while the Chinese kind has seven to thirteen leaflets.

Both types are splendid, vigorous-growing ornamental vines making wonderful displays when well grown, and selections should be made with the respective merits of each form clearly in mind.

The familiar Chinese wisteria on the left; the long-clustered, less well known Japanese wisteria on the right.

Courtesy Arnold Arboretum





McFarland

Boston-ivy, one of the most popular of ornamental vines.

CARE OF ORNAMENTAL VINES

*Given proper planting and training,
vines can be an asset in any garden*

Donald Wyman

IT is of the utmost importance that the right kind of vine be selected for the right place. Vines are vigorous growers—they can easily outstrip all other woody plants in the length they grow each year. Some, like the kudzu vine (*Pueraria thunbergiana*), can grow 30 to 50 feet in a single year! As a result, they can quickly cover wall or trellis space, but they can grow out of control just as quickly and create a great deal of extra work to keep them within the proper limits. So, a twining vine for a rain-spout or trellis, a clinging vine for a stone wall or trellis, an evergreen clinging vine for the chimney, and a fruiting vine where it will show off to best advantage—all these are possibilities, but each situation should be given careful thought before the vine is finally selected.

Soils. Most vines can be expected to grow best in good garden soils. In the case of wisterias (as is explained on page 71) too good a soil may result in over-vigorous vegetative growth and no flowers. For most of the vines grown for their foliage, this is not a special problem. Clematises are a bit difficult to grow well and present problems of their own, while the problems of growing rambler roses are sufficiently well known so that they need not be dealt with here.

Usually all vines will respond to a moderate amount of fertilizer by increased growth. However, they have individual methods of climbing and attaching themselves to supports. If one has a brick wall 20 feet high and 20 feet long, one plant of Boston-ivy could probably cover the wall eventually, but three or four



Courtesy Arnold Arboretum

Large leaves of Dutchman's pipe make a dense growth.

vines spaced 5 feet apart would do the job much more quickly. Sometimes it is desired to have a trellis completely covered with vines to screen the viewer and to give shade. In such cases, vigorous-growing, large-leaved vines might be in order. It should be remembered in this connection that not all vines grow as high or as dense as some. English ivy where it proves winter hardy, may grow to the top of the tallest tree yet not have the screening value of the larger-leaved Dutchman's pipe.

Training young vines need not be difficult. Once the purpose for which they have been selected has been decided, then comes the matter of training them to cover the trellis or wall properly. If they are to be tied to some support, the binding should not be too tight, otherwise it might strangle the plant. Vigorous pruning frequently results in increased

elongation of the stems remaining, but it should be remembered that all in all the plant that is heavily pruned actually produces less leaf surface in the end.

It has been observed that sometimes a vine that is trained horizontally will produce more flowers than one growing vertically, although this may not always be the case. Pruning of any kind might best be done in the early spring except on certain of the vines such as some kinds of clematis and the wisterias, which are grown chiefly for their spring flowers.

A vigorous, tall-growing vine will frequently produce a major part of its leaves at the ends of the shoots, i.e., considerably above the ground, thus leaving the basal portion bare of leaves. In this case, a runner should be bent downward and around the bare portion of the plant. If the vine is growing more than is desired, pruning the roots may reduce the over-all growth quickly.

Clinging Vines

Some of the clinging vines are very easy to start. Boston-ivy, for instance, quickly grows up a wall, fastening its small root-like holdfasts tenaciously to anything with which it comes in contact; and these hold the vine securely during the rest of its life. Some, such as the climbing hydrangea, are often difficult to start. This vine takes a year or so before it really begins to grow well. During that time the growth is slow and the small roots are not always able to hold the vine firmly to the wall. In this case, some support or system of tight wires should be used to hold the young shoots firmly against the wall; then it will not be long before the plant will be self-holding. An old vine on the three-story brick administration building at the Arnold Arboretum, once it was properly started, has never needed wires or any other means to hold it to the building in the forty-five years it has been growing there.

Some vines grow considerably faster than others, and this fact also should be taken into consideration when a variety is first being selected. Virginia creeper,

for instance, will grow twice as fast as English ivy. Consequently, if only a very small area is to be covered by a clinging vine, like the side of a chimney on a shingle house, the English ivy might be the plant to select; although it would take a longer time for it to cover the chimney, it would not require the constant pruning and cutting back afterwards to keep it from spreading over the shingles on the remainder of the house. Boston-ivy is another vine which is excellent for clinging to stonework but should be used carefully on houses where it can get between shingles. This vine grows very vigorously, at least 6 to 10 feet each year, and must be cut back rigorously at least twice a year to restrain it from covering the house. It is far better to plant a slower-growing vine under such circumstances, especially on small areas, and so save a great deal of pruning later on.

Sometimes it becomes necessary to remove an old, established clinging vine from a wall, and many stems are broken or injured and cannot be replaced. In this case, especially if the vine is a vigorously growing one, it would be better to cut the vine down to the ground and let it start up again.

This pruning should be done in the very early spring, not in the late summer or early fall. If work on the wall is to be done in the summer or fall, cut the vine down late in the spring and let it

grow as it will along the ground until after the work on the wall is done. Then most of the young shoots can be attached to the wall. The difficulty in cutting down an old vine in the summer or early fall is that the new growth might not have a sufficient time to harden off before winter; it might be seriously injured, if not completely killed back, by that first winter.

Twining Vines

It is the twiners that really create problems. Most of these are vigorous growers and unless carefully watched they will grow out of line and attach themselves to any means of support within reach. In training them one should know, first of all, that they climb by twining in two different ways. Some climb by twining from left to right, as do the members of the following genera: *Actinidia*, *Akebia*, Dutchman's pipe (*Aristolochia*), bittersweet (*Celastrus*), moonseed (*Menispermum*), silk vine (*Periploca*), some of the native *Wisteria* species and Chinese wisteria (*W. sinensis*). Others, such as some of the species of honeysuckle (*Lonicera*), Chinese magnolia-vine (*Schisandra chinensis*), and Japanese wisteria (*W. floribunda*), climb by twining from right to left. By winding young runners around their supports in the right direction, one can shorten the time it takes them to become properly established.

Courtesy Arnold Arboretum

Virginia creeper, if not restrained, soon grows beyond control.





Close-clinging, compact Boston-ivy, on the corner of this building (lower left), contrasts with the more robust Virginia creeper.

Photos courtesy Arnold Arboretum

On trellis. Of course the trellis is the first place one has in mind for twining vines. Many types of trellises are available and such vines as Dutchman's pipe and honeysuckle are old-fashioned favorites long selected for this purpose. Trees are the poorest kind of support that can be used. Usually the tree trunk is too wide for a young twining vine to make a complete turn. The smallest wire is far more suitable. Bittersweet, akebia, wisteria, and bower actinidia are all vigorous twiners. The uninitiated gardener might think it would be a good idea to have a graceful vine high up in the branches of some tree—and it might, but not a twiner. Such a vine can quickly strangle branches and trunks by completely encircling them,

and so cause considerable damage to the tree.

On house. There are times when a twining vine is wanted on the side of a house. This is certainly understandable for there is nothing quite as beautiful in the fall and early winter as a narrow column of fruiting bittersweet. Such a column can be grown by stretching a sturdy wire perpendicularly up the side of the house, preferably so attached that it is held several inches away from the wall. Bittersweet will quickly twine its way up such a support, especially if there are several horizontal "holds" for the vine, spaced 6 to 8 feet apart; once it grows up to these, it will twine itself around in such a way that it will not

American bittersweet
twining up a wire sup-
port on a stone house.



slide back to the base if heavy snow or ice places much weight on it in the winter. This type of support, too, is perfect for the shingle or clapboard house; when repainting time comes the entire wire need merely be removed and laid on the ground while the painting is being done. Later it can be replaced so that the length of the vine need not be shortened one bit by the painting operation. It is not too difficult to keep the vine restrained once it has reached the complete height desired, but it is important that it be not allowed to grow indiscriminately around the gutters and shingles. In so doing it can cause a real hazard by undermining the shingles; and it can produce a fire hazard by plugging

up the gutters in such a way as to cause the collection of leaves there in the fall.

Wisteria is more difficult to handle; the vine usually has to grow several years before flowers are produced and cutting it to the ground every so often would keep it from producing flowers almost indefinitely.

Most vines are interesting to grow and reward the gardener surprisingly for a little care. There are many places in every garden where vines can be grown to good advantage. If allowed to grow uncared for they can quickly become pests; but a little intelligent care at the right time, to keep them properly restrained, will make them real assets in any landscape or foundation planting.

CULTIVATION OF CLIMBING PLANTS IN A HARSH CLIMATE

*How vines are cared for at Reef Point Gardens,
Bar Harbor, Maine*

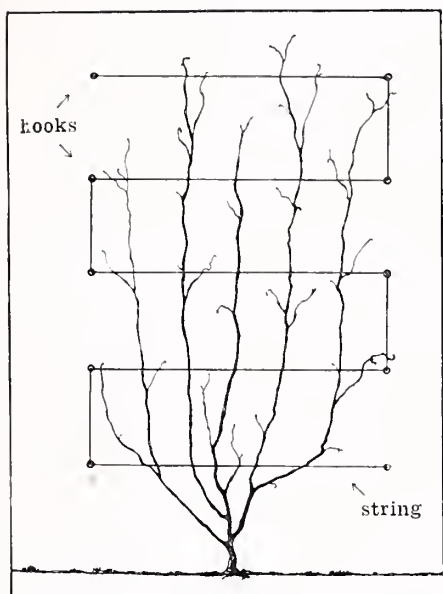
Amy Magdalene Garland

MANY of those who do their gardening in southern New England and the Middle Atlantic States have an idea that eastern coastal Maine is like their own surroundings. Actually, the eastern coast of Maine is more like the neighboring Canadian province of New Brunswick. The soil is usually thin and rocks lie near the surface; drainage is good except in occasional clay pockets. The climate is far more nearly that of nearby Canada than that of Connecticut or western Massachusetts. All of these natural conditions must be accepted as fundamental in any gardening effort in the sea-coast region of eastern Maine.

But what riches the thin soil holds for the gardener. Light, clean, and friable, it gives returns far beyond expectations. Climbing plants which suffer in the heat of the Middle Atlantic States, thrive and prosper; honeysuckles that are bothered by aphids in warmer climates are healthy and full of flower along the rocky coast of Maine. Many clematis species take kindly to the rigorous climate, and of course the "iron-clads" like *Akebia*, *actinidia* and *celastrus* are enthusiastic growers.

Planting must be done with care, and preferably in the spring. A generous-sized hole with lime or lime rubble and coal ashes is used for clematis, together with a commercial fertilizer such as 5-8-7, and bone meal. For the other creepers well-rotted cow manure replaces the lime and coal ashes.

Training the creepers is one of the early summer tasks which takes time and patience but is essential if the plant is to look tidy and show its flowers or growth becomingly. A simple method has been evolved after years of struggle and failure. The system is only applicable to climbers of fairly light growth. The heavy-wooded plants like *tripterygium*, *celastrus* and *actinidia* require heavy tying with thick soft cord attached to stout nails driven into the fence, wall, post, or whatever the plant is to be trained on. The clematis and honeysuckles are laced into place the way the old-fashioned hunting boot was laced. For this procedure, hooks are placed in the wooden walls, or on battens for this purpose placed in stucco or plaster. The hooks are turned downwards and a long roll of soft tan string is started at the bottom and laced up to the hooks in horizontal and vertical lines, which the accompanying diagram illustrates. In this way the growth of the creeper can be followed by extending the string to another level, where the little bunch of cord is tied and used again when another foot or so of growth needs to be led in the way in which it should go. The small-flowered kinds of clematis, such as *C. montana*, *rubens* or *C. viticella* can be trained by this method to make a complete window frame. The simplicity of the arrangement is obvious, and the creeper can be unlaced, laid down, or new shoots tied in



Author courtesy

Method of "lacing" a vine to a wall.

with no difficulty or waste of tying material. (Also see p. 56.)

Spraying with nicotine sulphate is done occasionally to fight aphids on the honeysuckles, but is only needed in what east-coast Maine calls hot weather.

Some of the climbers at Reef Point are lashed by heavy northeasters both in summer and winter, and if there is spray in the blasting winds, no harm seems to be done. However, the hot southwest winds in midsummer may cause bedraggled-looking plants for several days after the wind blast is over.

It is interesting to those in charge of the Reef Point Gardens climbers to note on their inland drives how few of the sorts grown by the seaside are attempted elsewhere. In fact, at the University of Maine in Orono, only fifty miles inland as the traditional crow flies, where the soil is clayey and the climate continental rather than maritime, many of the plants decline to live. In Connecticut tripterygioids grew poorly where they were planted on the college buildings at Yale,

and some of the clematis species just frizzled up in the heat. It is hard to generalize, as many of the clematis and honeysuckle species do not seem to be grown elsewhere than at Reef Point, even by enthusiastic gardeners.

Certain shrubs are used as wall plants; for example, winter jasmine (*J. nudiflorum*) is tucked into the most sheltered corner on the south side of the main house near the pink anemone clematis (*C. montana rubens*). It is given a light covering of spruce boughs in order to protect its buds, and answers to the treatment by giving winter flowers. On warm days in December and January the golden flowers appear on the green twigs, and if cut in bud and taken into a warmish room they give the lovely promise of oncoming spring. This twig cutting is almost the only pruning needed.

A big forsythia is trained on a less protected wall, and if allowed its own way it climbs in its string harness above a second story window. In severe winters the upper flower buds are blasted, but the lower ones do their spring duty where they can have even the slight protection of spruce or fir boughs. This particular forsythia is a seedling from one of the first wall plants planted on the north side of a line of college buildings at Princeton over forty years ago, where they are trained up to the eaves over the second story windows, and turn the wall into a sheet of gold in early spring.

While **fruit trees** are not technically climbing plants, they are treated as such at Reef Point, and in the shelter of the 6- or 7-foot kitchen garden fence, peach trees are spread out and tacked on the boards in the old French palmate pattern. The trees profit from the wind protection of the wall and usually yield good crops of fruit.

Further training methods have been invented to meet the local circumstances. For example the English woodbine (*Lonicera periclymenum*) is trained on horizontal lines on the low dry stone wall which supports the eastern rose terrace. Wedge-shaped pieces of wood are hammered firmly into the crannies of the wall,

and staples or nails again hammered into the flat outer ends of the wedges. Strings are tied to these anchors and the woodbine trained behind these light cords. The woodbines trained in this fashion seem to be less leggy and bare at the base than those trained perpendicularly.

Pruning is done usually in spring—the old wood of the forsythias, tripterygiums, actinidias and akebias is shortened or eliminated, where it can be done without deforming the plant by over-much slashing. Although textbooks say the clematis should be heavily pruned each spring, the species grown do not seem to ask for more than judicious thinning and

cleaning up of old used-up wood.

Many of the climbers growing at Reef Point Gardens are not supposed to be thoroughly hardy so far east and north, but no gardener is ever content until he experiments and perhaps fails, but more often succeeds in establishing in happy life a new and worthwhile garden inhabitant.

All who work in the gardens are trying to learn, sometimes by trial and error, sometimes in a spirit of adventure—since after all is said and done, gardening is like many other human efforts of which it may truly be said “Nothing ventured, nothing gained.”



A LOOK AT SCIENTIFIC PLANT NAMES

Are the scientific names of plants a mystery to you? Do you wonder why they are used? Do you feel that they are too difficult to bother with?

To answer the last question first; it is true that many of the scientific names are hard to pronounce at first glance, but this is only because they are unfamiliar. Actually, every gardener already knows and uses without a second thought a great many scientific plant names—chrysanthemum, for example; or viburnum; or delphinium. And as scientific names go, these are not particularly easy ones. There are some that are actually easier than the common names—com-

pare *Vinca major* with big-leaf periwinkle.

The chief reasons for their use are that they are specific—each name applies to one and only one kind of plant; and they are universal—the name of any given plant is the same in every language. Common names often lead to great confusion. How many different plants go by the common name of “mayflower”? Among the vines “woodbine” may mean at least two different plants—a *Parthenocissus* or a *Lonicera*.

Here are the scientific names of a few of the vines mentioned in this issue of PLANTS & GARDENS, with their pronunciations.

Common Name	Scientific Name	Pronunciation
Clematis	<i>Clematis</i>	clem'a tis
Euonymus	<i>Euonymus</i>	you on'i mus
Wisteria	<i>Wisteria</i>	wis teer' ee a
Honeysuckle	<i>Lonicera</i>	lm iss'er a
Glorybower	<i>Clerodendron</i>	clare oh den'drun
Threewingednut	<i>Tripterygium</i>	trip ter ij'ee um

THE UNUSUAL FLOWERS AND FRUITS OF AKEBIA QUINATA

This interesting twiner from central China, Korea, and Japan is one of the best of the foliage vines in the North. The flowers, appearing in midspring, are not conspicuous but are most interesting. The pistillate (female) flowers have three purple petals $\frac{1}{2}$ to 1 inch in diameter, with several conspicuous pistils in the center. The staminate (male) flowers are much smaller, practically all stamens. Often the staminate and the pistillate flowers are borne in the same loose pendulous cluster, about 4 inches long. Wind and insects in this country do not seem to be very effective in pollination. In certain areas fruits may result without human aid; but to insure the set of fruit, hand pollination must be resorted to at just the right time.

When this is done properly, the fleshy pods will develop by fall. These are purple, about 3 inches long, and filled with a mucilaginous material and many black seeds. These thick pods are useless, but the plant and its method of fruiting offer an excellent opportunity to observe sex in flowers and to do hand pollinating with results.



Roche

Flowers of akebia—the large one is female, small ones are male.

Courtesy Arnold Arboretum



The fruits of akebia.



McFarland

Bougainvillea provides masses of color for warm climate gardening.

VINES OF THE SOUTH

Many varieties of fine climbing plants can be grown in warm climates

Roger B. Thompson

VINES seem to be more expressive of the tropical exuberance of nature than do trees, whose stature and incidence are everywhere within comparatively narrow limits. The farther one travels into the warmer and moister portions of our country, the more numerous are the vines one encounters, the more numerous the species, and the larger they become. The liana-choked tropics are no myth.

Vines in the North are, if not always docile, at least temperate and rather easily controlled. In more favorable circumstances of temperature, moisture, and length of growing season these same species sometimes graduate (or degenerate, depending upon one's interest in luxuriance or control) into predatory monsters, hydra-headed and menacing beyond belief; and all have relatives.

I have never been sympathetic with those who complain about the common and expected problems of maintenance; but when a man can go through a planting with a ditchbank blade (one of the most lethal weapons ever placed in the hands of man—a wide, 18-inch, hook-billed piece of steel extended by a 3-foot handle) and return a week later to find his labors all undone, one can appreciate his wish that certain vines, at least, did not grow quite so rapidly.

Wisteria in the North requires its pruning, but here in the South it grows interminably. I once saw an entire yard fenced with a single plant. The owner had trained it over an arch above his front walk, and thence along a single strand of wire across the tops of forked cypress posts; it encircled his property

like a python. Another with a trunk as thick as my body hung upon a massive live oak, enveloping it almost to the tips of its twigs—the only tree with enough vitality to withstand its competition.

Insects. Vines as a class are singularly free from insect pests in the southern states, though with notable exceptions. Scale makes any attempt to grow *Euonymus fortunei* and its varieties a constant war, often brought to desperate termination by a steel instrument or a concentration of oil spray “guaranteed to kill.”

The **quamoclit**s, both cypress vine (*Q. pennata*) and scarlet starglory (*Q. coccinea*), annuals introduced from the tropics, have found the climate to their liking and run wild, tangling old cotton patches along with their small-flowered native relatives. An old field is often alive with their tiny scarlet stars amongst the more subdued pink, white, and blue of related species.

In the far South the **fingerleaf morning-glory** (*Ipomoea digitata*), a perennial, is one of the giants of its genus. Several thick succulent stems arise from a tuber to a height of 20 feet or more, bearing widely spaced five- or seven-fingered leaves broader than a man's hand. Flowers often as much as 3 inches across, rosy pink with deeper throats, are borne many in a cluster over a long period. Since, like other tuberous-rooted vines, it may be grown in the North by storage of its tubers over winter, the range of this attractive vine should be liberally extended.

Yellow jessamine or Carolina jessamine (*Gelsemium sempervirens*), often popularly called “jasmine,” though widely distributed, seems not to be extensively cultivated. It is the state flower of South Carolina, and grows wild along the woods edge, twining and rambling over the bushes. We often come upon it in the midst of the forest, where it has grown up with the trees, unsuspected except when its fragrance permeates the whole woodland or its fallen yellow trumpets carpet the forest floor. Even then the cable-like stem, often hanging free

from the high branches, may give the only clue to its precise whereabouts. Many have planted it with little success—shade for its roots, abundant water, and perhaps a nearly neutral soil being necessities.

Firecracker vine (*Manettia glabra*) is a tender vine which never gets out of hand, twining only to the eaves of a single-story house. Cut down by frost each year, it is hardy only where the ground never freezes; but its small, shining leaves make a very pleasing foliage mass, and the abundant, tubular, red flowers (1½ inches long and produced over a long season) make it a very attractive addition. It is one of the few South Americans on our list.

Cherokee rose (*Rosa laevigata*) is often defended as the most valuable native rose in the southern states, so welcome and so fitting has it become to the landscape. High-climbing, rising to 40 feet or more, and conspicuous by its light green foliage at any time in summer, it is at its best when clothing a tree on the forest edge. In May, when dotted with its single white flowers nearly 4 inches across, it is a sight worth driving miles to see.

The name “Cherokee” is unfortunately often misapplied to another single-flowered rose—a Chinese adventurer, *Rosa bracteata*, which is not only far inferior in bloom but of a habit that has made it such a pest in grazing lands that its eradication has become a subject of considerable concern.

Coral vine (*Antigonon leptopus*) is one of the best-loved of all southern vines, and one of the most widely distributed. So tender as to be cut to the ground by frost as a matter of course, we find it in midsummer covering the verandas along whole streets and smothering entire fronts of houses. The usual color of its small flowers, garlanded like beads, is bright rosy pink; but when the white form is also present in a neighborhood, seedlings of any tint betwixt the two may be locally common.

Climbing by tendrils, it loops and sags, and having reached the top of its



Cross vine.

McFarland

support cascades down again before regaining its hold; so it is often covered with bloom from top to bottom.

Cross vine (*Bignonia capreolata*) is very spectacular on the edges of woodlands in May, where its massed trumpets cover small trees like a thrown blanket, but it is not generally accepted for cultivation. Its blooming season is short and quickly over; one day it is in glory and next morning, after a little rain, its crown is in the mire.

Neither is the **trumpet vine** (*Campsis radicans*) much planted in the South except by those who use it to attract humming birds through the long, hot weeks of summer. Perhaps its rampant growth is not in its favor; but there is often prejudice against common things, especially



Buhle

Clerodendron thomsonae, with its fine foliage and striking red and white flowers, is an excellent vine in warmer climates. In cooler regions it makes a superb greenhouse subject.

The large yellow flowers of *Allamanda cathartica hendersoni*, contrasting with its glossy foliage, make a brilliant display.



McFarland

those cherished by simple folk, who, never having known affluence, almost universally respond in a direct, impulsive way toward beauty without questioning its rarity or price.

Another of the bignonia family, **catclaw** (*Doraxantha unguis-cati*), hardy only to zone 8, consistently gives perhaps the finest foliage texture of any evergreen capable of completely covering the highest of brick walls. The small, narrow and dark leaflets are in pairs; what were once the terminal three have degenerated into three needle-pointed wiry claws which catch in mortar like steel hooks. With these the vine clambers easily up the tallest walls, and as easily over any shrubbery in its way. Although branching but sparsely, its multitude of stems and incorrigible vigor make up for the deficiency, since the stems swarm over

Cypress vine.

McFarland





In foreground, juvenile form of creeping fig; in the rear, the mature form with unsightly projecting branches.

Courtesy Roger B. Thompson

each other and interweave to make a continuous cover.

Rooted beneath azalea it is an especial menace, tougher than its competitor and more securely anchored. One may in desperation transplant and comb the roots of the outraged azalea, only to find that every cut fragment of *Doranthra* root and stem is cheerfully sending up new shoots. The golden flowers are of too brief duration to warrant its use in any but the most easily restricted situations.

Creeping fig (*Ficus pumila*) is hardy only in the far South, for it withstands only a few degrees of frost. It is one of those Jekyll-and-Hyde plants that start out by matting a wall with diminutive, evergreen, deeply veined leaves so tender in appearance that it invites coddling. Abundantly able to care for itself when strongly rooted, it is capable of enveloping an entire building and raising upon it a forest of horizontal, coarse-leaved branches. These must be pruned away

every year to preserve a trim effect. Although a single plant may go four or five stories high and cover 5000 square feet of wall, it is rather easily kept within bounds.

Kudzu (*Pueraria thumbergiana*), native to China and Japan, and frequently hailed as the savior of the South's eroded lands, is not always an unmixed blessing. Its place is definitely in gullies and on sides of cutbanks and ravines. The difficulty is to make it stay there, for it travels underground as well as on the surface and is not easily controlled by any mechanical means. Our modern growth-regulating chemicals must be relied upon to keep it within bounds. Left to itself it could easily take the countryside, since it is not dismayed by trees 60 feet tall and often may be seen covering not only the clay banks where it was planted, but the face of the abutting forest as well.

Blue flowers among vines are somewhat rare. The two **nightshades**, jasmine nightshade (*Solanum jasminoides*), which bears a strong superficial resemblance to a clematis when not in bloom, and the much coarser and more lavender Costa Rican nightshade (*S. wendlandi*) offer welcome change from a surfeit of pink and white. Neither will withstand frost below 20°F., but both may be easily started from cuttings in a warm temperature. The finest specimen of the jasmine-foliaged species I ever saw—a much finer one than any in a near-by large city noted for its parks and fine private gardens—covered the entire veranda of an old negro's weathered home. His wife had brought a piece of it in her pocket from "somewhere" (origins are deliberately and obviously evaded as a matter of course) and had grown it to perfection. I saw this one day with a few clusters of the shallow, bell-like blossoms still poking hopefully through a load of wet snow at 24°F. The next week the temperature dropped to 18° and the vine was killed to the ground, though its roots survived an even lower temperature that winter without protection.

Passion flower (*Passiflora incarnata*) is a common native throughout the South,

found abundantly rambling over fences and in waste places; it is too common to be much appreciated by many save those so divorced from country living that it seems to them a rare thing, an exotic. There are few flowers more remarkable in appearance or more intricately formed. The crown of colored filaments overlying the ten-parted floral envelope, the whole overtopped with three styles, and the five large-anthered stamens joined to make a supporting tube, all together make a most fantastic assemblage, 2 to 3 inches across.

Blue crown passion flower (*P. caerulea*), a Brazilian, is even larger and showier, 4 inches across, with the rays blue, white, and purple. It is hardy about as far north as its native relative, that is, into Virginia. Other species or hybrids, either white or of various combinations of white, blue, purple, and red are mostly tender, lending their presence only to Florida when unprotected. Some of these come satisfactorily (though not quickly) from seed, but all, apparently, strike well from cuttings of ripened wood.

The little annual relative with yellow blossoms an inch across (*P. lutea*) is common over much of the same territory as *P. incarnata*, but it is little noticed and is seldom recognized as being a passion flower at all.

Evergreen wisteria (*Wisteria megasperma*), from Australia, looks somewhat like the familiar oriental species, though considerably coarser and darker because of the thick, evergreen leaves. Once considered a separate genus and imported into this country under the name of *Millettia*, it has since been placed with the more familiar wisterias. The flowers appear somewhat later in the spring, and since the stems are never bare, are apt to be securely hidden from casual observation. The racemes are short and closely packed with small, dark reddish-purple flowers of a distinctive fragrance. Hardiness to only about 20°F. considerably restricts its range.

Another tender evergreen, the **star-jasmine** (*Trachelospermum jasminoides*), a Chinese acquisition, has been so long



Blue crown passion flower.

Roche

associated with the South that it has acquired the name of "Confederate," as though it were a native. The flowers are white, with a short tube and five twisted petals, and have an overpowering fragrance. Somewhat slow to start, after two or three years it becomes well rooted and will not only go to the house roof but will make such a heavy thatch of stems which accumulate leaves and bird nests, that it has to be continually reduced.

The farther one penetrates into the warmer portions of the South, those regions where freezing temperatures are less and less a limiting factor, the more spectacular are the flowers and flowering habits that come into view. Several vines are not fully hardy even along the Gulf Coast, which is subject to severe freezes now and then. They are commonly grown in that region, nonetheless, on the gamble that they may survive several successive winters before a particularly severe cold spell destroys them. A series of warm winters promotes the extensive use of these tender species, only to be followed by discouragement when one or two cold nights (with temperatures below the mid-twenties) bring disaster. The discouragement is the more pronounced since the phenomenon occurs too rarely to accustom gardeners to losses and replacements any northern gardener would take as a matter of course. As a rule, plants are not protected, and their owners seem at a loss when faced with such emergencies.

The flowers of *thunbergia* (*T. grandiflora*), unlike those of its annual relative of northern gardens (*T. alata*), are large, and sky-blue on the wavy spreading border, nearly white in the throat. These flowers are borne in clusters of several to a dozen or more over a long period in midsummer, making a very beautiful display. The rather sandy, moist soil of the coastal region, with some leaf mold or rotted manure added, seems to suit them well when the planting is made in light shade.

Two *clerodendrons*, both called glory-bower or bleeding-heart (*C. speciosum*

and *C. thomsonae*), are hardy enough to be grown wherever the winters are rather mild, since both bloom on new wood, and usually are not severely damaged when cut to earth by frost. Both species have small, red, tubular flowers. They are borne in flat clusters 4 to 5 inches across. The red tube is nearly hidden by the inflated, 5-angled calyx, so only the spreading margin and stamens protrude. In *C. thomsonae* this papery calyx is ivory-white, in the other dull pinkish. In both it is persistent for weeks after the red corolla has dropped away, giving an increasingly large display as blooming progresses, though the older clusters gradually decline in brilliance. The large, ovate, deeply-veined, dark green leaves alone are almost sufficient reason for growing these vines.

Allamanda (*A. cathartica*) is one of those questionables which make one wonder, each night of temperatures below freezing, whether or not they have been completely killed. It is obtainable in half a dozen varieties, robust or slender, large- or small-flowered; the smallest flowers are slightly larger than those of the northern trumpet vine, and the greatest, fully 5 inches across. The size and brilliance of these largest blossoms are quite staggering.

Most of the *bougainvilleas* are hardy only in areas completely free from frost, and in consequence are almost strictly confined (in the east) to Florida. The one exception is *B. glabra sanderiana*. This relatively hardy Brazilian is seen all along the Gulf Coast, where its massive color makes it an important addition to the sunny garden. It will not bloom well in shade. Cuttings of this variety root without difficulty over heat, and it sometimes sows itself. The less hardy species, red, scarlet, lavender, or white, root with more difficulty and are likely to be less free in their flowering.

Again, in *bougainvillea* it is not the corolla that gives the show, but the three large, brilliantly colored bracts, paper-thin and persistent.

CLIMBING PLANTS IN EASTERN MAINE

*Unusual and beautiful vines thrive at
Reef Point Gardens, Bar Harbor, Maine*

Beatrix Farrand

TWENTY YEARS ago the seed of an idea for Reef Point Gardens germinated in the minds of Max and Beatrix Farrand. As they had enjoyed their house and garden for twenty or more years, they began from that time to plan for its future as a guide, companion, and helper to garden lovers and students of gardening. About eight years ago Beatrix Farrand started the actual

redesigning of the house and grounds, as a memorial to her husband and their love of gardening in eastern Maine. They had often spoken of a wish to show climbing plants in a becoming and horticulturally correct way, and with this goal in view the house and galleries connected with two near-by garden houses were reconstructed or built anew. The result is that over six hundred feet of wall space is devoted to the cultivation of climbers of various sorts which have already proved themselves hardy in cold winters and tolerant of dry and sometimes hot days. Others have been added; many of these are described by the delightfully expressive phrase "precariously hardy," but they seem to thrive year after year about three hundred feet from the shore of Frenchman's Bay.

A complete collection of climbers was clearly out of the question; consequently those of comparatively easy culture and recognized attractiveness were first chosen. One of the very first to be planted over seventy years ago was Dutchman's pipe (*Aristolochia durior*), a specimen of which was set on either side of the entrance porch, where they still flourish. Perhaps the leaves are a trifle coarse and large in scale, but they have been in their places so long that a hard heart would be needed to uproot them. The old Virginia creeper (*Parthenocissus quinquefolia*) was also planted when the house was built, but only scraps of this remain,

Climbing hydrangea at Reef Point Gardens.
Photos author courtesy



as they have been pulled out, crowded unmercifully, and ruthlessly cut back. The finer-leaved *P. quinquefolia engelmanni* grows well and is not as overwhelmingly invasive as its larger cousin. Of course the so-called Boston-ivy (*P. tricuspidata*) is represented but it is not allowed to cover the buildings like a glove—it is kept carefully pruned so that only the finer shoots cling to the low stone wall where it is planted.

The blue-berried *Ampelopsis brevipedunculata* is lovely in the autumn and drapes itself in hanging garlands over a small garage. The true grapes are represented by *Vitis thunbergi* from China and *V. riparia* of our own eastern states. A splendid plant of *V. coignetiae* was growing vigorously on the south side of the main house and its great leaves were gorgeous in color every autumn; a large well-established plant, directly in the path of the remodelling, it was unwisely moved. It declined and finally died, but one of these days a successor will be planted to gladden the eyes of autumn visitors. Edible grapes are also planted on the solid fences surrounding the vegetable garden.

Collection Limited to a Few Kinds

Although the Farrands were plant lovers they realized they should not attempt anything approaching a complete assemblage of climbers, and they therefore deliberately limited themselves to choosing two or three of their favorite sorts to grow in a representative collection. The two predominant kinds selected were clematis and honeysuckle. These were at first tried tentatively, and on finding that the first trials were surprisingly successful the numbers of species and varieties and hybrids were increased. Some were planted with little hope of success, but many of these grew well and withstood temperature changes of over a hundred degrees. In Maine, occasional winter nights push the thermometer down to 15 or 20 degrees below zero, and hot summer suns stimulate the mercury to over 90.



Tripterygium produces trusses of fragrant flowers in midsummer.

Honeysuckles

The honeysuckles were known to be fairly hardy, as the porches of old cottages on Mt. Desert Island were draped with the climbing shoots and red flowers of *Lonicera sempervirens*. Therefore this was planted, but the Reef Point specimen grows rather poorly, because the right place has not yet been found for it. Then the English woodbine (*L. periclymenum*) was tried with misgivings, and it responded with unbounded enthusiasm. A low wall supporting the little rose terrace is fragrant with its flowers almost all summer and its glistening red berries are borne with the late-season flowers. The variety *belgica* is also grown. The early-blooming *L. caprifolium* is also a joy as the fragrant blossoms in the early season are both astonishing and pleasing. Within the last few years *L. caprifolium*



Akebia is a free-growing and appropriate vine for many uses.

Photos courtesy Arnold Arboretum

has had troubles, perhaps fungus of some sort not yet known at Reef Point Gardens, or perhaps a virulent mildew. But it is a beautiful climber and the color and vigor of the blossoms and leaves are refreshing.

Lonicera tragophylla from China was given to the gardens by the Arnold Arboretum and for some years was spectacular with its large butter-yellow heads of flowers and bronzy green leaves; this vine has been a little unhealthy lately, although perfectly hardy. Its offspring, *L. tellmanniana*, a cross between *L. tragophylla* and *L. sempervirens*, is more gorgeous in its orange color, but it too has had attacks of disease and though also quite hardy, has not grown well lately. One plant, on a neighbor's place, just suddenly "up and died" in midsummer. A horticultural clinic is needed for these three sorts, as they are too ornamental and fragrant to lose without a struggle. The inconspicuous flowers and beautiful foliage of *L. flava* decorate an iron railing on eastward-facing steps, and *L. heckrottii* seems quite contented both on the east and on the west sides of the northern garden house. The pestilently invasive *L. japonica* is fortunately not hardy, but the others are strong and attractive and add greatly to the many walls of the house. In fact, many of the

honeysuckles are more successful in eastern Maine than in the hotter summers of southern New England and the Middle Atlantic states. And they are less troubled by aphids.

Miscellaneous Vines

Charles Sprague Sargent, first Director of the Arnold Arboretum, was endlessly kind to his pupil Mrs. Farrand, and often gave her surplus plants to try in the more rigorous climate of eastern Maine. One bundle contained a *Tripterygium regeli*, which Professor Sargent scornfully described as a "dud"—to which Reef Point was most welcome. The Arboretum could not make it succeed. This species of the *Celastrus* family was planted on the southeast corner of the house, and started to grow with rampant cheerfulness. Its sweetly scented trusses of tiny flowers are often nearly 3 feet long, and in July the whole side of the house where it grows is as murmurous with bees as any English lime-tree walk. It comes from the mountains of eastern Asia, and apparently rejoices in the cold climate of Bar Harbor. It is clean and very strong in growth and thrives so well that its seeds have been distributed to many botanic and private gardens. In fact tripterygium is treated as a stop-gap and general utility plant. Where an architectural

utility is particularly evident, a "trip" is planted and soon races up an ugly downspout or floats its long streamers from an awkward corner. The one thing the "trips" will not stand is lack of water; they need copious drafts of it even when their neighbors show no signs of flagging. The relatives of tripterygium, *Celastrus scandens* (bittersweet) and the Asiatic *C. orbiculatus* are grown with success.

Before starting the long list of clematis varieties, a few other climbers may be mentioned. The utility class should include *Actinidia arguta*, as it is a vigorous grower, hardy, and as free from disease and insect pests as tripterygium.

Actinidias are clean and fresh all summer and toward autumn bear a green fruit, which to some looks indigestible, but to others is pleasant and mild in flavor.

Akebia quinata is a staunch standby and grows freely yet gracefully on any of the four compass point exposures. *Akebia* is always attractive, as its foliage is free of insects, somewhat grayish green in color and in early summer clusters of mulberry-colored little flowers are partly hidden under the leaves and waving ends of the branches.

The Baltic ivy (*Hedera helix baltica*) grows best when overgrown by another climber. On the west side of the house it snuggles under a light and flowery mass of late-flowering yellow clematis, and tightly clings to an old brick chimney, apparently accepting with complaisance the matted growth of a big climbing hydrangea. At one time *Wisteria sinensis* was grown on the south side of the house, but finally it was dismissed as it was agreed that "its room was better than its company." To be sure, it grew well and the healthy leaves were pretty, but it flowered sparsely and the waving branches were a nuisance to train and keep in bounds; furthermore it took up space now occupied by clematis and honeysuckle. *Euonymus fortunei vegeta* is grown at the foot of a low wall, and vigorously pruned so that it is often mistaken for a shrub. This variety

attracts scale like a magnet, and although our plant is still free from this pest, it is troublesome to keep in bounds and in good order, so only one specimen is grown. It must be acknowledged that its lustrous evergreen leaves and orange-red fruit are attractive when all the other creepers have shed their leaves for the winter.

The two plants which make the most spectacular show in late June and early July are the *Tripterygium*, with its long plumes of creamy green flowers, and the two big *Hydrangea petiolaris* vines, one on the east and one on the west side of the house. Each one is 30 or more feet high with hundreds of creamy white flowers and sturdy red twigs, held well out from the wall. It is a joy to see these two creepers full of strength and life, and clinging so firmly to boards, shingles, plaster, or stone; no laborious tying is needed. Sometimes after a particularly cruel winter the hydrangea seems to flower a little less freely. Its less well

Japanese hydrangea-vine (*Schizophragma hydrangeoides*).





Roche

October clematis (*C. apiifolia*).

known cousin *Schizophragma hydrangeoides* has not yet attained the height and strength of the climbing hydrangea but it grows well and is hardy on the north side of the north garden house. And its flowers, somewhat like those of the hydrangea, have a peculiar distinction.

Clematis

Probably the most generally admired climbers are the clematis group. They begin blooming in late May, when *C. montana rubens* surrounds a south window with its graceful garlands. Following *C. montana* there is some clematis in flower until well into October. There seems to be no halt in the procession, and when one plant ceases flowering its neighbor takes over until the whole summer has been beautified by their grace and charm. The south window frame on which *C. montana rubens* grows with its delicate reddish shoots and soft pink flowers, looks like the frontispiece to an old gardening book. The vine is easily

trained and seems to stay in good condition, even on hot summer days.

The clematis species, rather than the hybrids, have been chosen for decoration of the Reef Point walls; they are not as spectacularly effective, but are easier to grow and seem less subject to the sudden ailments which shorten the lives of many of the large-flowered hybrids. However, early in the season the hybrid NELLY MOSER displays her pale lavender flowers in profusion on the east side of the south garden house. Here, in passing, it may be wise to say that almost all the creepers described have east or west exposures and consequently are not forced to endure a whole day of hot sunshine.

The *vitalbas* are among the most faithful and trustworthy of the species clematis; the native *C. virginiana*, the European *C. vitalba* (travelers' joy) and the western *C. ligusticifolia* have all been grown with ease and satisfaction. The western species needs replacement since a borer damaged it beyond hope of recovery. Other true species seem to thrive, among them *C. texensis* with its attractive thick red sepals and lovely feathery seed heads. *C. crispa* and *C. fusca* grow well, and while not the same, their flowers of pale lavender and white are a little like those of *C. texensis*. *C. viticella* has made itself so much at home that its seedlings sprout readily near the parent plant. The deep violet-blue flowers, while small, are carried in profusion and make a delightful wall cover. A later species is *C. apiifolia*, which gives a creamy mass of bloom on an eastward-facing step balustrade. This species, strangely enough, is seldom grown, while its later-blooming relative, *C. paniculata*, is seen everywhere and is always pretty.

There are hybrids of *C. viticella*, *C. viticella kermesina*, and LADY BETTY BALFOUR, which are to be trusted as to hardiness and regular flowering, and are well worth growing. Some of the large-flowered hybrids are less reliable and harder to grow; *C. jackmani* is beginning to do better now that its roots are shaded by low box bushes, but it dislikes the baking of the western sun. *C. henryi*

is grown, but is more successful in a neighbor's garden, while COMTESSE DE BOUCHARD is more tolerant and flowers fairly late in the season. MADAME EDOUARD ANDRÉ, the deep red sort, is doing fairly well, but is not in an entirely satisfactory position. The hybrid of *C. terensis*, DUTCHESS OF ALBANY, is a good grower and pushes its way to the top of the south garden house, with slender shoots and deep pink flowers. A hybrid of *C. heracleifolia*, *C. jouniana*, is an excellent and sturdy plant. The stiff shoots and plentiful bluish-white flowers frame the eastern library windows and the plant is completely hardy. Another *C. heracleifolia* hybrid is MRS. ROBERT BRYDON. A deeper blue, more like its parent, it is less strong-growing than *C. jouniana*.

Toward the end of the season the small yellow tulip-like pendent flowers of *C. tangutica obtusiuscula* cover its delicate shoots, and later still the seed heads, fairly iridescent in the autumn afternoon sun, are nearly as lovely as the flowers.

No doubt the omission of climbing roses will be noticed. Only two sorts are grown, the well known and healthy DR. W. VAN FLEET and the little known French rose RÉVEIL DIJONNAIS. These two are cultivated just to show that climbing roses can be grown, but many sorts are difficult; they need much spraying, they are subject to mildew and many are sensitive to winter cold.



McFarland

Golden clematis
(*C. tangutica obtusiuscula*).

Climbing plants are cherished by those who work at Reef Point Gardens and are admired by visitors. The walls they cover are vertical flower beds, full of charm and beauty. Growing climbers is one of the most rewarding and least troublesome of the many forms of garden art.



A NEW RACE OF EVERBLOOMING CLIMBING ROSES

In selecting climbing roses, the new Brownell roses called Everblooming Pillars should not be overlooked. They combine tallness and hardiness with the flowering habits of hybrid tea roses.

The new canes bloom as they grow, bearing flowers in clusters. Blooming continues until frost. In form, color, and fragrance, the blossoms compare favorably with the flowers of the present hybrid tea roses. Pink, red, and yellow

flowered varieties are available; new ones are being constantly developed.

The plants can be grown as climbers, or cut back as pillars or bushes.

Tests make it evident that this race is as hardy as the *Rosa wichuraiana* climbers. Unprotected, they will withstand temperatures to 15° below zero; covered with earth, to 35° below zero. If in very cold areas they are killed to the ground, they will grow up from buds below, to make a tall bush.



McFarland

English ivy, if not allowed to grow out of bounds and if not exposed to too much winter sun, is an excellent evergreen vine.

VINES FOR WINTER BEAUTY

*A few vines give beauty the year round;
these are well worth knowing*

Donald Wyman

THERE are not many vines that have leaves or fruits all winter long, especially in northern gardens, so what few there are we should know well. First, of importance because it is grown from New England to Florida, is the English ivy (*Hedera helix*), a native of Europe but undoubtedly planted here in America since the earliest colonial times and now naturalizing itself in several places in the South. It will be a long time before this vine becomes the pest that it is in Europe, where it has overrun many a garden and must be grubbed out in the same way we must frequently remove Hall's honeysuckle (*Lonicera japonica halliana*).

English Ivy

At least thirty-eight varieties of *Hedera helix* have been recognized by botanists recently and there are undoubtedly others. This is a considerably variable species, cultivated for centuries, probably one of the reasons why so many variants have been found. It is of interest to note that on old vines, the foliage of the branches on which appear the flowers and fruits, differs from the younger juvenile foliage. At Kew Gardens in London, England, cuttings taken of this older wood have rooted and given rise to shrubby plants, not at all like the vine which one customarily sees.

In the South, where this vine has been widely used and many old plants exist, the differences in the foliage on old and young portions of the vine are clearly present for all to see. In southern California, the vigorous young growth has been trained over wire fences and thus simulates excellent hedges. It withstands clipping well and of course functions as an evergreen hedge throughout the entire year. As a ground cover or a climber on rock piles or stone walls it is excellent for its evergreen leaves are always present to give it charm.

A few varieties can be mentioned that show the different types available: ALBANY is erect and shrubby in habit; *aureo-variegata* has leaves that are variegated with yellow, making this a truly beautiful specimen where it can be grown and displayed properly; *baltica*, one of the hardiest clones, apparently perfectly hardy in all but the most severe winters even in Boston; *conglomerata* with very small leaves, usually not over 1½ inches long and two-ranked on stiff upright stems, making it a popular and perky pot plant; *digitata* with leaves larger and five- to seven-lobed; *minima* with very small leaves but at the same time very unstable in habit; PITTSBURGH, a variety in which lateral shoots appear in most of the leaf axils. These are only a few but will illustrate some of the variations

available. All in all *Hedera* is an excellent vine with many uses in the South as well as in the North and is one of the most common of all house plants also.

Euonymus

The only other truly evergreen vines are the various kinds of euonymus, mostly varieties of *E. fortunei* which is itself a climber like the English ivy, attaching its small root-like holdfasts tenaciously to any upright with which it comes in contact. The small, pointed evergreen leaves of the species can be ½ to 2 inches long. This native Chinese plant is also variable, and several varieties have arisen over the years.

There are several named varieties, each one of which has its special qualifications for growing in gardens. Only two of them normally fruit. The more popular of these is the big-leaf winterreeper (*E. fortunei vegeta*) which can be grown either as a vine or as a semi-shrub. This has somewhat rounded leaves 1 to 1½ inches long that are thick and leathery. In some places these may not remain on the plant the entire winter, but in other areas they often will. This was first introduced into America by the Arnold Arboretum in 1876 and has been very popular ever since. The fruits appear early in its life and are quite conspicuous. The pale pinkish capsule splits open

Courtesy Arnold Arboretum

Fruiting branch of big-leaf winterreeper.





Euonymus fortunei var.
SILVER QUEEN.

Photos courtesy Arnold Arboretum

in the early fall to show the fleshy orange colored berry inside, somewhat the same size and shape as the fruits of our native bittersweet. It is easily propagated by cuttings, making it an excellent subject for trial in the new home propagation units now proving so popular.

The other **fruiting variety** is *E. fortunei carrierei*, with long pointed leaves at least 2 inches in length, one of the first forms to appear on the species once it has been growing for some time in one place and has formed a sizeable vine. This too is semi-shrub-like with glossy leaves from which it takes the name glossy winterreeper. It fruits well and clings to the walls just as well as does the species.

For **autumn coloration** there is nothing better in the line of an evergreen than the variety *E. fortunei colorata*. This variety does not climb as well as do the others but is best used as a ground cover, growing about a foot or so in height. In the fall the foliage colors a rich purplish-red and retains this color all winter. If planted where the foliage is exposed to direct sunlight in the late afternoons, this color is especially pronounced, and the plant can be most effective throughout the winter months at the end of a stone wall and where the shoots are allowed to

branch over and hang down for a few feet.

There are at least two other varieties of interest for their **variegated leaves**, although it is not uncommon to see an old plant of almost any variety eventually developing one branch with some variegation in the foliage. The variety *E. fortunei gracilis* has leaves that have a white, yellow or sometimes even a pinkish margin. This is not a vigorously growing vine like some of the other varieties, but has been used in rockeries or on the low stone foundation of wooden houses to give some color variation in the evergreen planting during the winter months. SILVER QUEEN is somewhat similar except that the margins of the leaves are completely white. This form has also been used effectively as a slow growing vine, almost shrubby in nature.

The two **small-leaved varieties**, *minima* (see page 52) and *keuensis*, have the smallest leaves of any northern woody vine, deciduous or evergreen, the former having leaves about $\frac{1}{2}$ inch long and the latter having even smaller leaves.

It is only fair to mention the fact that all these members of the euonymus clan are susceptible to serious infestations of scale in some areas (see article on page 63).

Honeysuckles

Two honeysuckles must be again mentioned in this grouping of vines for winter beauty, namely, Hall's honeysuckle (*Lonicera japonica halliana*) which has been thoroughly described elsewhere in these articles, and Henry honeysuckle (*L. henryi*) which is slightly more hardy and not as rampant a grower. Both have evergreen foliage except near the extreme limit of their range (Boston, northern New York, and Ohio) and are adaptable as either ground covers or twining vines.

Bittersweets

The bittersweets certainly must be mentioned, for, although there are other fruiting vines some of which hold their fruits long into fall, these hold their fruits far into the winter or until such time as the birds eat them. Two species are commonly grown, although several others are available if one makes a patient search of many catalogues: the native American bittersweet (*Celastrus scandens*) and the oriental bittersweet (*C. orbiculata*). In both the sexes are separate as is explained elsewhere, and in both the winter beauty is provided by the bright colored orange and red fruits.

The difference between these two species is that in the American bittersweet the fruits are borne in terminal clusters of many berries, while in the oriental bittersweet the fruits are borne in small lateral clusters. The leaves of the latter are also more rounded or orbicular than are those of the American native. Both make excellent ornamentals when properly grown; it is not correct to say that one is a "better" fruiting plant than the other.

In the South

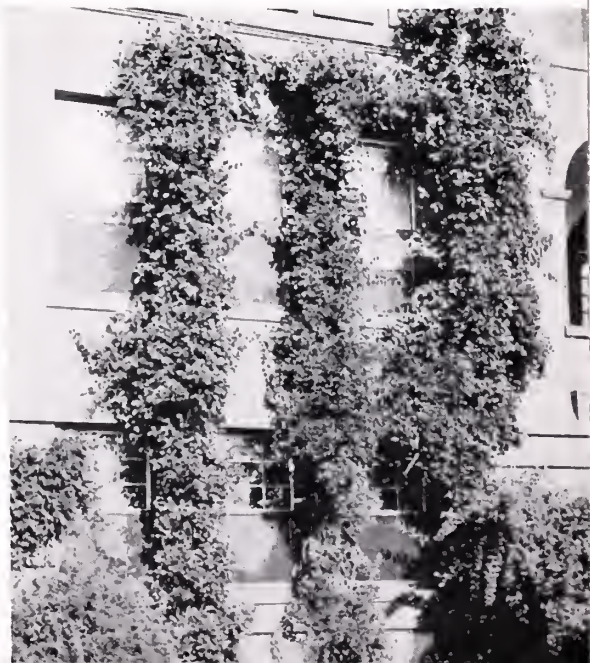
The farther south one goes, the more evergreen vines one finds in the gardens. South of Washington, D. C., for instance, in addition to the vines already mentioned, the twining scarlet kadsura (*Kadsura japonica*) begins to appear here and there in gardens. It is of value for its evergreen foliage, scarlet berries, and reddish autumn color. A few of the

more protected gardens are fortunate in growing the blue crown passion flower (*Passiflora caerulea*) with semi-evergreen leaves, climbing by tendrils and with beautiful blue to pure white flowers, one of the most beautiful of the passion flowers that can be grown in this country. One of the best evergreen climbers for this particular area is *Pileostegia viburnoides* with its excellent glossy green leaves, and a growing habit similar to that of the climbing hydrangea.

A little farther south the angle-twig magnolia-vine (*Schisandra propinqua*) can be used. An evergreen vine with orange flowers and brilliant red berries, unfortunately it is in that group of plants which have all the staminate flowers on one plant and the fruiting or pistillate flowers on another. The cat-claw funnel creeper (*Doranthia unguicati*) also is a popular evergreen.

From Charleston, South Carolina, south into even warmer climates, other evergreen vines are used, such as the beautiful purple-bell cobaea (*Cobaea scandens*). Sometimes called cup-and-saucer vine, it has 2-inch-long bell-shaped flowers of lavender to purple, tenacious tendrils, and the excellent characteristic of blooming

Twining oriental bittersweet must be provided with wire supports.





Roche

Cobaea scandens (see also illustration
page 6).

during a six month period. The creeping fig (*Ficus pumila*) should certainly not be overlooked, for as a closely attached small-leaved evergreen vine on a wall it really has no peers. In fact, the stems hold themselves so tightly to the wall, that when they cross each other they frequently become grafted together. The young growth of this vine is what is mostly desired for it forms the perfect closely knit wall covering.

Finally, as one more example of an excellent warm-climate evergreen vine there is the blood trumpet vine (*Phaederanthus buccinatorius*), a native of Mexico, with blood-red flowers appearing for long seasons in some areas and continuously in others. It is of interest to note that this is a fast growing vine; one report from Santa Barbara, California, tells of a wall surface 50 by 33½ feet that was covered in two years' time.

These are a few of the vines of interest during winter. Though those which can be grown in the far South are more numerous and varied in character than the species available in the North, all can add a bit of cheerfulness to any garden where they prove hardy.

McFarland



Young growth of creeping fig is a fine evergreen vine in warm climates.

VINES ON WALLS

Which vines to use; how to plant and care for them

Lyle L. Blundell

CLINGING vines furnish their own trellises. All that is needed is a vertical surface; they will make themselves very much at home on tree trunks or on walls, whether masonry or wood. Here a precaution is in order. Vines crossing a shingled facade may add much to the picture; but when they are permitted to remain too long on wooden structures, especially in wet climates, the retention of moisture about the aerial roots makes preservation of wood difficult. It is safer to restrict clinging vines to brick or stone masonry, stucco, chimneys, or rock walls.

Planting

Planting of these vines against a building wall is many times unrewarding and disappointing for several years. This is because soil at the bases of walls is generally the poorest encountered on a property. All manner of construction debris, with little or no good growing soil, is likely to be dumped back against the foundation as backfill; not until the roots have extended beyond this debris into the better soil well away from the foundation does the vine show any appreciable indication of covering the space provided for it. Thorough preparation of the soil is more important at the bases of walls on which vines are to be grown than anywhere else in the garden, because of the large leaf surface which it will be called on to nourish. When poor soil conditions are found, all soil and debris should be removed from a much larger

hole than seems warranted by the root system planted. A hole 2 feet deep and 3 feet wide, extending to the undisturbed soil beyond the foundation excavation, is not too large. Backfill this planting area with good loam into which has been incorporated well-rotted manure to one-fourth of its volume. If manure is lacking, leaf mold or compost fortified with commercial fertilizer will suffice. If the soil is unduly heavy, sand should be incorporated to make it more friable. In such a soil the vine will quickly make the anticipated cover.

Training

No clinging vines, when well established and vigorous, are particular as to the surface over which they travel; therefore a severe pruning program will have to be carried on to keep them from wooden walls, windows, and cornices, or otherwise held within bounds. Fortunately few of them are hurt by severe pruning.

Another means of growing vines against walls—one that maintains more automatic control of the area of coverage—is to place an iron pipe trellis or a wire or two against the wall (see page 56); on this support a twining vine such as bittersweet, honeysuckle, or wisteria may be grown. For a low wall or a wooden house, a wooden trellis can be used. I recall one very effective garden retaining wall treatment. The wall was covered with common wintercreeper for winter richness; outside of this, about a foot from



Photos courtesy Arnold Arboretum

Wintercreeper (*Euonymus fortunei*) used without restraint soon completely covers a wall.

the wall surface, was an open wooden trellis which carried climbing roses for summer floral display.

Vines are planted essentially for the beauty of their foliage. This is especially true of wall vines. The beauty and character of the plant is largely governed by the richness and texture of the foliage. The side of a large building can very adequately take a large, fast-growing, coarse vine, whereas a small garden requires a richer, finer-textured plant.

Evergreen Vines

Evergreen vines have the richest foliage and generally are the most refined in growth and appearance; wintercreeper (*Euonymus fortunei*) and English ivy (*Hedera helix*) can surpass many deciduous vines in wall coverage. Evergreen vines are broad-leaf plants and in the North are frequently subject to late

winter foliage burn caused by excessive loss of water from the leaves when the ground is frozen and moisture cannot be replaced. This burning can be reduced to the minimum if evergreens are restricted to north and east exposures. Never plant an evergreen vine on a southwest exposure, where the burning is most severe because of the drying afternoon sun.

The smallest and most refined of the evergreen climbers is the **baby wintercreeper** (*Euonymus fortunei minima*). This miniature variation of the wintercreeper, with leaves the size of one's little fingernail, seldom grows over 3 feet high, and actually does not cling but will grow erect against a wall, tree trunk, or garden ornament. This is a choice miniature for an intimate spot on a low wall. It is one vine that rarely needs pruning.

The **common wintercreeper** (*Euonymus fortunei radicans*) is more robust, but may take many years to reach 10 or 15 feet high. It clings by rootlets, so crevices in the wall help its anchorage. The leaves are an inch long, oval, deep green, some of them more or less streaked with white.

Grown in deep shade, this plant will probably change very little in form in many years; but when given a freer growing location, within a few years the plant changes in character. Large branches grow horizontally from the wall; the leaves become larger and glossier, the buds are larger, and small green flowers and tan and orange fruits are produced in clusters on these branches. This mature form is known to the gardener as the **glossy wintercreeper** (*Euonymus fortunei carrierei*)*. The over-zealous growth extending from a building wall may catch high winds and the whole vine may be pulled to the ground. The horizontal branches can be cut back to half their length, thereby reducing the wind leverage, and the whole surface of the plants can be made neater by this shearing. A

*This giving of varietal names to different stages of the same plant is unfortunate and leads to considerable confusion.—Ed. Com.

wire stretched along the wall will give added support.

Similar to the glossy wintercreeper, but with slightly larger, round, and less shiny leaves (about the size of a half-dollar), is the **big-leaf wintercreeper** (*Euonymus fortunei vegeta*). The flowers are produced freely and are small and greenish; the fruits which follow, dangling clusters of orange berries in creamy husks, remain throughout the winter. From the appearance of these fruits the plant is often called the evergreen bittersweet. While these two fruiting forms of wintercreeper are usually propagated by cuttings, the seeds can be planted and will produce the juvenile, or nonfruiting, forms. The seedlings of the big-leaf wintercreeper are round-leaved, small, and a very soft dark green. This variation seems to have been overlooked, as I have never seen a name assigned to it. I recommend these big-leaf seedlings for a rich vine or ground cover.

One other important variety, the **purple-leaf wintercreeper** (*Euonymus fortunei colorata*) seems not to develop rootlets. I have only once seen it take to a wall enthusiastically, and this was with the aid of the gutter downspout. (See page 61.)

Pests. All wintercreepers are attacked by a serious insect pest known as the euonymus scale. This insect makes more than one brood a year—the hotter the weather the greater the number of broods—so that a small infestation can spread rapidly in the course of a year. The insects finally become so thick that the plant looks completely white, the leaves drop off, and the plant soon dies. Control is difficult when the insect is well established. (See page 63.) Many gardeners are abandoning this plant because of the seriousness of this insect attack.

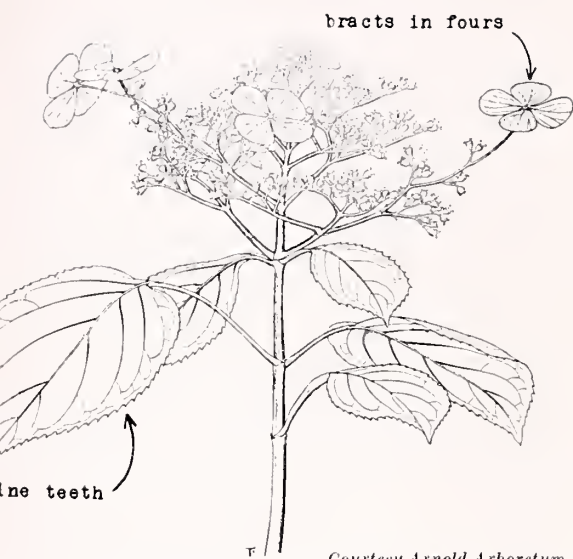
English ivy (*Hedera helix*) needs no introduction. Its many varieties and its general usefulness as a house plant have made it familiar to everyone. South of New York almost any of the varieties can be used out-of-doors with promise of success in the shade, but as one goes north many varieties will not winter well. Nurseries north of New York are supplied



Self-supporting Boston-ivy climbs to the top of a stone garden house.

The tree form (mature) of English ivy.





Courtesy Arnold Arboretum
Climbing hydrangea (*Hydrangea petiolaris*).
The leaves are large, up to 4 inches in
length, with fine teeth. The showy white
petals (actually bracts*) are in fours.

with a hardy form obtained from the Baltic Sea area, known as Baltic ivy (*Hedera helix baltica*). This has been able to survive some of the worst winters when grown on a shaded wall. The leaves of this variety are of medium size, 1 to 2 inches, and have whitened veins which add to their interest. It clings by rootlets along the stem, and keeps flat against the wall. After several years of luxuriant growth on a wall, this plant may suddenly send out horizontal branches at the top, usually around the cornice of the building. These branches have less pointed leaves or leaves with no points at all, and produce terminal clusters of greenish flowers followed by black berries (see illustration, preceding page).

Deciduous Vines

Deciduous clinging vines have compensating characters which make up for their lack of foliage in winter. The blaze of color on the creepers in the fall makes this season their most outstanding, and

the flowers on the climbing hydrangeas add to their spring attractiveness.

The smallest-textured plant among deciduous vines is **Low's Japanese creeper** (*Parthenocissus tricuspidata lowi*). Used on low walls or at an entrance, it decorates without dominating. The leaves are only about an inch across, several pointed, and curled; they have short stalks so that the growth stays close to the wall. The holdfasts are not so well developed as those of *P. tricuspidata*. This vine produces no fruit but its fall color is a brilliant red.

Japanese creeper (*Parthenocissus tricuspidata*), also called Boston-ivy, although it is a native of Japan and China, is the most generally useful of all clinging vines. It attaches itself to the wall at first by "sticky fingers"—branched tendrils with enlarged disks at the ends of the branches; as it grows, the larger stems develop aerial roots which hold more firmly. The leaf somewhat resembles that of English ivy and here, as in English ivy, there are two plants in one. As the new growth starts out from the root, spreading in all directions, the leaves are small (less than an inch across), and sometimes purple and divided into three parts when young. As the plant develops, the leaves become larger; along the older stems the flower spurs develop—leaves here may be 4 to 8 inches across on stems a foot long.

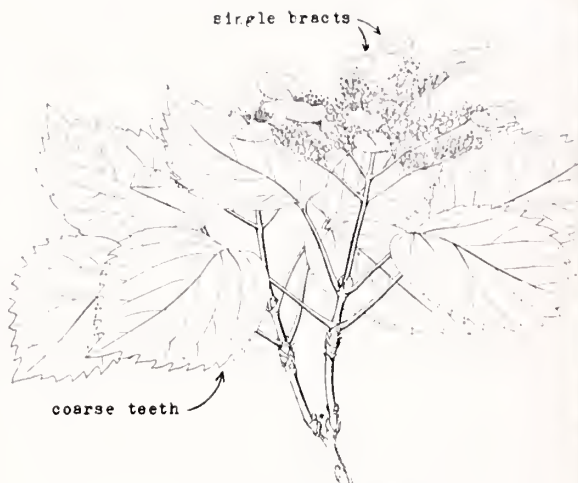
The young, or juvenile, stage of the plant, with small leaves, has given rise to a variety named **Veitch's Japanese creeper** (*Parthenocissus tricuspidata veitchii*). If one wishes to keep this character, the vine can be pulled from the wall periodically, so that it will send out its new delicate tracery across the face of the wall. But when given free rein, this vine is a vigorous wall covering and has no concern for windows in its path. It is not particular about soil, and is most useful in covering large blank walls as it becomes larger in scale with its own maturity. The bees find that this plant furnishes a great supply of midsummer nectar from its greenish flowers, and the

clumps of blue berries that follow add to the picture in the fall after the gorgeous scarlet leaves drop. The berries are persistent; and for those of us in the North another interesting picture is produced as the wet snow clings to the fruit spurs in an interesting pattern of blue and white against a wall.

The native **Virginia creeper**, (*Parthenocissus quinquefolia*), sometimes also known locally as woodbine, is not so successful as a wall vine. It is even bolder in its foliage effect, but neither the disks that stick the plant to the wall nor the aerial roots are so well developed as in the Japanese creeper. Certain varieties, particularly var. *saint-pauli*, are said to cling more closely, but the best recommendation for these vines is to have a very rough surfaced wall or wires attached for support. Otherwise the plant will come plunging down in a year or two.

The leaves of Virginia creeper are five-parted and vary in size from a few inches across near the end of the stem to more than a foot across along the older stems. The shoots tend to grow vertically, spreading less broadly than those of the Japanese creeper; so for a complete cover, plants must be planted more closely. The various shades of red make the plant one of the most brilliant in the fall landscape. The blue berries, the size of a small pea, are borne in open clusters and either fall before winter or are eaten by the birds after the leaves drop.

Another "almost holding" vine is the **trumpet creeper** (*Campsis radicans*). This vine clings with the aid of a few rootlets at each joint; and unless given the aid of a gutter downspout or a chance crevice, it will be pulled down by the wind, which whips the large free-growing branches. Although usually used as a trellis vine, I have seen it attach itself, climb a two-story house, go up the roof, and seem to look for further heights after reaching the top of the chimney. The foliage is not very rich, being similar in appearance to ash leaves. The gorgeous orange or red trumpet-shaped flowers, 3 inches long in terminal clusters, are the great triumph of this vine, and the rather thick eigar-



Courtesy Arnold Arboretum

Japanese hydrangea-vine (*Schizophragma hydrangeoides*) is sometimes confused with climbing hydrangea. Its leaves are smaller, seldom more than 3 inches long, and their teeth are coarse. The white petals (bracts*) occur singly.

like fruit pods on the bright tan stems add to its winter interest.

The coarsest of all self-attaching vines are two related plants, the **climbing hydrangea** (*Hydrangea petiolaris*) and the **Japanese hydrangea-vine** (*Schizophragma hydrangeoides*). These plants are so coarse that they are satisfactory only on the largest and coarsest of stone work, where they are happy in scale. Both of these vines cling by rootlets and thrust out from the wall branches 1 to 3 feet long, on which the leaves and flowers are borne.

Opinions differ as to which of these vines is to be preferred, most authorities recommending the climbing hydrangea. My own preference is for Japanese hydrangea-vine; I like its sharply saw-toothed, smaller leaves, as well as its shorter branches and habit of remaining closer to the wall.

*"Bract" is a botanical term referring to more or less altered leaves which often look like petals.

VINES ON BUILDINGS

And methods of attaching them

Milton Baron

In planning the use of vines on buildings, esthetic aims must be balanced against practical considerations. Vines, like other plant materials, used correctly, enhance the architecture by interesting line, foliage pattern, and in certain cases, flowers. Poor features of the building's exterior may be hidden and the harshness of large areas of brick or masonry be relieved.

When there is little room for trees or

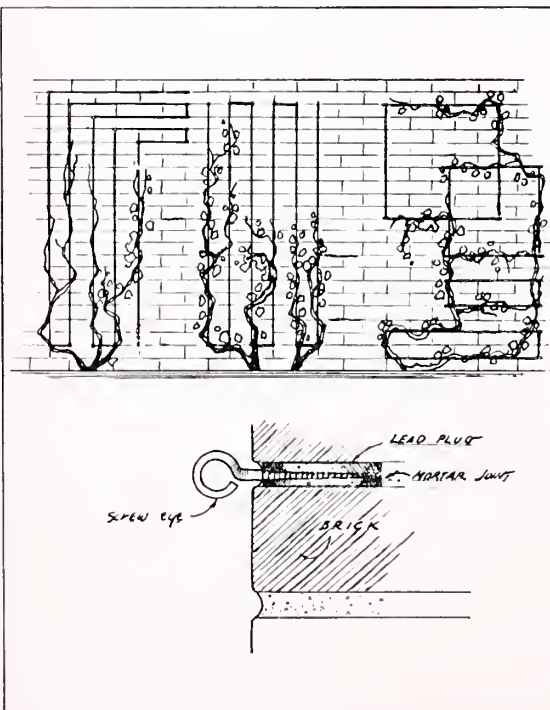
Vine supports of galvanized or braided wire fastened with hooks or screw eyes are not obvious to the observer.

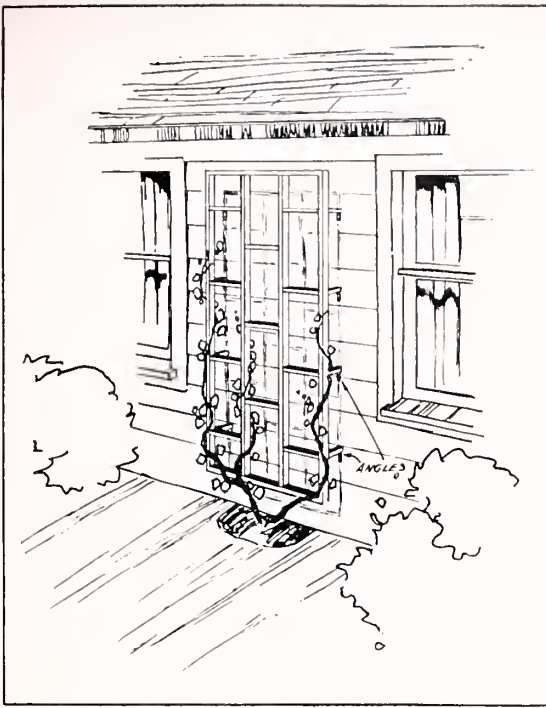
Drawings by William J. Johnson

shrubs, as is frequently the case in our cities, vines can be used on buildings even if there is only as much as a square foot of soil for planting. The arrangement of planting pockets must be decided upon prior to laying concrete or asphalt surfaces. Besides growing in restricted areas, many vines tolerate adverse conditions such as the deep shade of north exposures, city atmosphere, and low soil fertility. Years ago it was thought most climbers were slow in starting. This has been disproved by giving reasonable care to vines planted in pockets of well prepared, enriched soil. Certain species will grow six or more feet the first year, far exceeding the increment of other woody materials for the same period.

As a result of this rapid growth, certain vines may become too large for their location or too heavy for their supports. Occasional vigorous pruning may be necessary to keep growth within proper bounds. When too many vines are planted, or if allowed to grow without restrictive pruning, even window screens will be covered by a heavy matting of green. No control except pruning in the early summer seems to check this. Reduction of the vine mass also cuts down on roosting places for birds.

Fortunately, vines are easy to maintain. In general, they are subject to but few insects or diseases; as a group their care is no greater, and in many cases is less, than that of trees or shrubs. Should



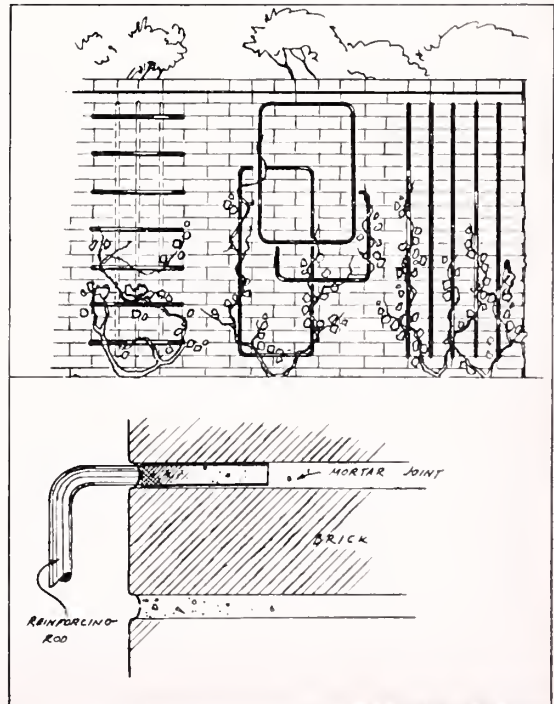


Useful for supporting vines against wooden walls are wooden vine supports. These should be designed to harmonize with the architecture of the building. They should be attached with metal angles to allow easy maintenance.

minimum upkeep be desired, proper selection of the species at the start is all-important.

Since vines climb in several ways, this characteristic is most important. Vines which climb and adhere by means of root-lets or tendrils with discs (see page 10) support themselves as they grow and are perhaps the most practical to use. They should be used only on structures or walls of stone or masonry. If used on wood, they cannot be easily removed when painting is needed, and they have a tendency to damage the surface and wood itself. Wooden structures are best clothed by vines separated from the wall surfaces to allow air circulation and easy maintenance. To accomplish this the choice should be from the group which twines about a support (see page 9) or which climb by means of tendrils (see page 11). These must be provided with means of climbing support, otherwise they make an unsightly heap or trail aimlessly on the ground.

The most permanent kinds of vine supports are made of reinforcing or wrought iron rods. They form a definite pattern against the wall or building.





McFarland

Hall's honeysuckle is an excellent ground cover but must be kept within bounds.

VINES AS GROUND COVERS

Many climbing plants provide effective ground cover at small expense

Donald Wyman

MANY a plantsman is now beginning to eye every plant which can be used as a ground cover with a great deal of interest. Home owners, landscape architects, and even those men who have the responsibility of planting our highways, are using these plants more and more. There are many kinds of plants suitable as ground covers, both woody plants and herbaceous types, but there are none that are as cheap to plant and which make a quicker covering than some of the vines.

It must be admitted that some of these grow so fast as to become a nuisance or even a menace to surrounding plants, yet there are situations where a quick cover at little expense seems desirable. To plant 100 square feet to *Pachysandra* would

take a minimum of 100 plants, but only 4 of bittersweet (*Celastrus*) or Virginia creeper (*Parthenocissus quinquefolia*). There are many places where neat, uniformly high ground covers are desired and many of the vines will not fill the need. On the other hand there are places, especially on banks or in rocky terrain, where the vines serve admirably as the ground covers needed most.

Because of their fast growth, they can become unruly as ground covers, and may grow out of hand. Such has been the case with Hall's honeysuckle (*Lonicera japonica halliana*)—an excellent ground cover if kept within bounds, but once allowed to escape and then neglected it can quickly become a vicious pest. The five-leaf akebia (*A. quinata*) is another that

can grow out of control very quickly and, since it climbs by twining, will soon cover any upright shrub with which it comes in contact. However, even with such drawbacks, these vines do have their uses in covering the ground. Let us investigate some of them.

Akebia. As far as I have been able to observe, the five-leaf akebia has no insect or disease troubles, which is certainly an excellent qualification for a ground cover. It may grow as much as 3 to 15 feet each year and is of special interest because even in the North its leaves remain on late in the season. A twining vine, with deep roots, it seems to grow in almost any soil, and its compound leaves of five leaflets give it a delicate texture.

Bittersweet, also a vigorous twiner, unfortunately is susceptible to attacks of scale, but these can be controlled by spraying during the dormant period with a dormant oil spray. When a bank is to be planted, no attention need be given the sexes of the plants, especially if they were grown from seed, for sufficient of them will be pistillate to give some color in the fall and early winter when they are in fruit. These too will twine around any upright woody seedling within reach, hence to look well, all such shrubs or small trees should be removed. This plant will not lie as flat on the ground as will akebia, for it tends to grow upward, circling around its own stems to make huge mounds when used as a ground cover. It can be mercilessly pruned but this will result in many dead stems. As a rank growth of woody twining stems several feet tall, this fast growing vine might have merit but only in places where it can grow practically unchecked.

CAUTION

Do not plant bittersweet where it can escape into the wild and become a rampant pest and nuisance plant, twining up into trees and shrubs, and serving as a good host for scale.



McFarland

Unrestricted American bittersweet growing over trees and shrubs.

Hall's honeysuckle is well known. Its semi-evergreen leaves are one of its outstanding qualifications in the winter, and its fragrant flowers in June are always remembered. It too is a vigorous twiner with all the attendant troubles, yet it is still used in ground cover and bank plantings at the rate of hundreds of thousands of plants each year.

Not so well known is the closely related Henry honeysuckle (*Lonicera henryi*), which looks practically the same as Hall's but does not grow nearly as vigorously—and it is hardier, too. This last characteristic makes it of more interest to northern gardeners.

Common moonseed (*Menispermum canadense*) is not seen very often in gardens because it is such a pernicious pest. It climbs by twining but seldom grows over 12 feet tall and has leaves somewhat like those of the English ivy, though

slightly larger. Usually it dies down to the ground in the winter, hence its use as a ground cover is restricted to those places where a display of summer foliage only is desired. But never fear that winter is the end of it, for it will come back with increased vigor from the roots the following spring. I have pulled up underground stems of this vine that are nearly twenty feet long. When it has "escaped" and reached the pest stage, it is practically impossible to eradicate except by the use of a chemical weed spray, for if even the smallest portion of one of these roots is left in the ground, that will give rise to a new plant (and more long runners!) the following year. So here is the one vine at least that has little value except as a ground cover in poor soil where little else will grow, and in an area from which it cannot escape to the main garden.

English ivy. Of the evergreen ground-covering vines, the English ivy (*Hedera*

helix) should be given first consideration since it is always evergreen and always neat in appearance if given a small amount of attention. Although not considered completely hardy in northern New England, it is frequently found performing yeoman service as a ground cover in the Boston area. On Cape Cod, and deep into the South, the English ivy proves excellent. Alone it is fine, but many choose to plant bulbs in with it and these make a beautiful combination in the spring when they appear. The hardest form is supposed to be the Baltic ivy (*Hedera helix baltica*) but there are some other strains appearing now which may be just as hardy if not more so. The Missouri Botanical Garden has named several clones which seem to be perfectly hardy in the vicinity of St. Louis, Missouri.

Two members of the **Euonymus** clan might be mentioned here. One is the running euonymus (*Euonymus obovata*), a

Euonymus fortunei colorata is a fine ground cover that turns reddish-purple in winter.

McFarland



native of the eastern United States and hardy almost up to Canada except in the midwestern section of the country. It is not an evergreen but is deciduous, growing faster than its evergreen relative (*E. fortunei colorata*) and having an excellent red foliage color in the fall. *Euonymus fortunei colorata* does retain its leaves all winter long. They are about an inch in length and in the fall take on a delightfully pleasing reddish color that is retained all winter. Perfectly hardy in central New England, this ground cover has been widely used in neat formal plantings, and one can see it about some of the government buildings in Washington. Because of its evergreen nature, it works in especially well with formal evergreen plantings. Not too fast-growing, it is easily restrained by occasional clipping. Like most of the other varieties of this species it is susceptible to scale troubles, but these can be controlled as noted in another article (pp. 63 and 64).

The **Virginia creeper** (*Parthenocissus quinquefolia*) is a native vine frequently found in the woodlands throughout the entire eastern United States. It climbs by attaching small root-like holdfasts to any means of support, but if these are absent, it runs along the ground, rooting here and there along the stems. It is truly a high climbing vine, frequently growing fifty feet or more up the tree trunks with which it comes in contact. The large compound leaves turn a brilliant red in the fall, especially in situations where they are exposed to the direct rays of the western sun. It is one of the first of all woody plants to display its fall color. When grown as a ground cover it should be pruned occasionally to make the branchlets grow more dense, since in fast-growing plants there may be some distance along the stem between the leaves. With a little pruning and the lifting and replacing of some of the runners over any bare spot of ground, it is not long before this vine will well cover the ground. There are several smaller-leaved slower-growing varieties also available from some nurseries. This vine and its varieties are especially adaptable for

use as a ground cover in front of some old stone wall or fence row, for if allowed to grow towards it and then up and over it, the resulting uniform cover will be delightful indeed.

Roses. Years ago (nearly 65) the Arnold Arboretum introduced a new rose from the Orient named *Rosa wichuraiana*, now called the memorial rose. This is a flat creeping rose that even then appeared to be valuable as a ground cover. Plants were grown and tried as a bank planting in Boston's Franklin Park where they proved very successful, and this rose has been highly valued for this purpose ever since. It is the only rose species that is truly procumbent. Since its introduction it has become one of the parents of the modern rambler roses, for it has been used in many hybridizing experiments with *R. multiflora* and other species, especially because of this trailing habit.

The flowers of the memorial rose are about two inches in diameter, pure white with a center of yellow stamens, appearing about mid-July or slightly earlier farther south. The glossy, small, compound leaves are semi-evergreen, remaining on the plant far into the fall and early winter. Fruits are reddish and not very ornamental, but still they are produced and are larger than those of *R. multiflora*. This rose also has the habit of rooting occasionally along its procumbent stems. We have frequently increased our plantings of this ground cover, merely by cutting off rooted branches and replanting them in a new bed. An excellent, neat-appearing ground cover, especially suited for bank planting, memorial rose has small thorns sharp enough to discourage people from walking through it.

The common **periwinkle** or myrtle (*Vinca minor*), is really not a vine in the sense that bittersweet or Virginia creeper are, yet it certainly should be mentioned for it makes an excellent ground cover. It is a procumbent plant, with runners over the surface of the ground which frequently take root, making it very easy to divide and replant. A native of Europe and eastern Asia, it has

been used as a ground cover for centuries. The leaves are evergreen, and the plant grows equally well in sun or shade, an excellent qualification for any plant in this group. It is always neat in appearance and is not susceptible to insect or disease pests. This plant too, is adaptable to planting on banks, and aids in holding the soil. The flowers are lilac-blue, white, or pink, depending on the variety, rather small, appearing in very early spring. As a low ground cover, seldom over a few inches in height, needing practically no attention providing it has good soil in which to grow, it has no peers.

In the warmer parts of the South, the big periwinkle (*V. major*) is grown as a ground cover. This plant has longer shoots and larger leaves than our northern species, but most northern gardeners are familiar with it because the variegated form is a common greenhouse pot plant. It is frequently seen in window boxes and trailing down greenhouse benches, but is not hardy outdoors over winter in the North. It has all the good qualities of *Vinca minor* as a ground cover.

Other vines used as ground covers in the South would include the pepper-vine

(*Ampelopsis arborea*), a native of the southeastern United States from Virginia south to Florida and Mexico. Its dark, lustrous, semi-evergreen leaves that are doubly compound, its method of climbing by tendrils, and its habit of suckering freely, go to make it a good ornamental climber as well as a ground cover.

Rarely do we find a New Zealand plant growing in America outside the subtropical areas, yet the wire vine (*Muehlenbeckia complexa*) is one that should grow even as far north as New York City. Not often seen, it is nevertheless one of those deciduous twining vines with leaves only about an inch long, that grows sufficiently rapidly and densely that it can cover the ground. Perhaps its chief call for fame is its ability to withstand saline growing conditions at the seashore, an obvious advantage.

Finally, the last vine to be mentioned for the far South is the silver-vein creeper (*Parthenocissus henryana*), a vine from central China, which might be grown in the shade to bring out to best advantage the beautiful white stripe along the mid-vein of the leaf.

These are not all the vines that can be grown as ground covers either in the North or the South, but these are usually considered first and foremost.



NOTE ON VINES AND PESTS

Fortunately for the home owner, there are many excellent ornamental vines such as the five-leaf akebia and the trumpet creeper which are not attacked by any serious insect or disease pests. These can be grown with little attention. Then, there are some like the *Parthenocissus* species which are usually unaffected by pests, but if there is a serious infestation

of the Japanese beetle around, these vines will be sought among the first by this pernicious pest. There are also a few of the honeysuckles, for example *Lonicera sempervirens*, which are susceptible to bad infestations of plant lice, but these can be controlled easily by spraying with nicotine sulfate or "Blackleaf 40" at the proper time.

EUONYMUS SCALE

How to combat this serious pest

ABOUT the only vine pests causing any serious difficulty in the northern and central part of the country are the scale insects, chiefly attacking *Euonymus* and sometimes the bittersweets. *Euonymus* scale especially causes much injury over widespread areas. This pest was introduced into America from the Orient prior to 1880 when it was first discovered in this country at Norfolk, Virginia. Since that time it has spread widely both in the United States and Canada, although it must be admitted that at present the pest seems to be more difficult in the eastern and northeastern parts of the country than it is elsewhere.

A thorough study of the life history and control of this pest has recently been completed by William Cantelo at the University of Massachusetts. As a result of this study, the following information is offered about the control of this bad pest.

Life History

Euonymus scale not only infests species of *Euonymus* but sometimes is found on the varieties of the common lilac, on bittersweet, on *Lonicera periclymenum*, and on *Jasminum*. The treatment or control is the same in each case. Most of the small white scales that are seen are the males, which are very small and narrow, while the females are larger, wider and light brown, and consequently not so easily seen at the first glance.

When the crawlers first emerge from the egg in the spring they move around on the plant for 12 to 36 hours, and then they settle and remain in one spot. They

may crawl anywhere from $\frac{1}{8}$ inch to 16 inches during that period. It takes about 46 days for the scale to mature, and in the vicinity of Massachusetts there are two generations a year. They spend the winter either as a mature or immature fertilized female. Their life history is definitely dependent on the weather, for in one year with a cool late spring, crawlers were not noticed until June 15th while in another section with warmer weather they appeared June 1st. It is essential to keep this in mind when determining the time to spray.

Control

No half measures will control *euonymus* scale. It can seriously injure and actually kill well established vines if allowed to go unchecked. Sometimes it may be necessary to cut the vines to the ground, spray the remaining stubs thoroughly and so start the plant all over again, in order to control the pest properly.

The best dormant controls that are effective are the dinitro-ortho-cresylates such as "Elgetol" or "Krenite." These can be used at the rate of 1 or $1\frac{1}{2}$ gallons per 100 gallons of water in the early spring from about March 1 to April 20. These materials discolor woodwork and if this feature is objectionable, the less effective dormant oils might be used at the rate of about 4 gallons per 100 gallons of water. None of these materials kills 100 per cent of the scales, and if this dormant treatment is not followed with other sprays, the chances are that the infestation can be quickly built up to its

former strength in two or three generations.

DDT has been found to be one of the most effective sprays to use during the growing period when the plants are in leaf, since its effectiveness lasts for more than one week and also it is one of the few materials known to kill two-week-old crawlers. So, the best way to control euonymus scale is to use the dormant spray at the proper time and then follow it the same year with these four sprays:

1. When crawlers of first generation hatch (about June 1-15 in Massachusetts)

25% DDT emulsifiable concentrate

—2 qts. per 100 gal. water

or

50% DDT wettable powder—3 lbs.
per 100 gal. water.

2. Repeat 10-14 days later.

3. Repeat when crawlers of second generation hatch (August 5-20).

4. Repeat 10-14 days later.

It should be emphasized again that constant vigilance is absolutely necessary in controlling this scale. Spraying should be done as soon as possible (according to the above mentioned schedule) after the presence of the scale has first been noted. Do not be satisfied with one or two sprays but make the entire five the first year and several the year after. Even then the vines should be examined closely and frequently in order to spray as soon as the pest returns. A well grown, scale-free planting of *Euonymus* is well worth a little attention now and then.



ON VINES THAT HIDE WALLS

VINES should enhance rather than conceal beauty. To hide an ugly old stump, a tumble-down wall, or some other unsightly object with vines is not only legitimate but desirable. But why bury a beautiful well-built stone "fence," or handsome stone or brick wall of a fine

building in the same way? For these, Low's Japanese creeper (*Parthenocissus tricuspidata lowi*), sometimes sold under the names Low's ampelopsis or miniature Boston-ivy, is to be favored over the ordinary Japanese creeper, or "regular" Boston-ivy (*Parthenocissus tricuspidata*).





McFarland

Poison-ivy grows rampantly over fence and trees.

POISON-IVY

This too is a vine but unlike most of the others, poison-ivy (*Rhus radicans*) is one we are always trying to eradicate. A vigorous grower, it will spread over anything and grow up the first upright object it reaches by attaching its small aerial roots tenaciously to the means of support. Even at the seashore it grows within reach of salt water spray. Its autumn color is a rich orange and red. The compound leaves, made up of three parts, should be familiar to everyone, and its small white berries should also be just as well known. Unfortunately they are not! Last winter, in a Boston suburb, some energetic garden club ladies included these "new berries we found in the woods" in some excellent Christmas wreaths, only to spend the vacation days uncomfortably realizing what it was they had used.

Chemical sprays can eradicate poison-ivy if used at the right time and frequently. DuPont's "Ammate" is one of several. It should first be applied in June as a spray on the foliage just before it has completed growth. Another application should be made when new leaves

begin to appear on the injured stems, and again the following year. If one waits too long in the summer before applying the first spray, it may not be nearly as effective as if applied in June. The hormone weed killer spray 2,4,5-T also gives successful control, and is sold under such trade names as Esteron, or Ester Brush Killer.

On left, Virginia creeper with leaflets in fives (and blue berries). On right, poison-ivy with leaflets in threes (and white berries).

Buhle



FAMILIES OF VINES

And some of their non-climbing members

Donald G. Huttleston

THE early botanists, in the eighteenth century and before, grouped plants according to habit. Thus they placed the trees, the shrubs, the vines, and the herbs in separate groups. As botanical knowledge increased, it became evident that the members of these groups bore no relationship to one another, and that, on the other hand, individuals of separate groups were obviously closely related. Even with superficial observation of the various honeysuckles (*Lonicera*), it is evident that there are very close resemblances between some that are shrubs and others that are vines. It is also obvious that all the beans, peas, and wisterias are very closely related, though they vary in habit from small annuals to large woody vines and even trees.

Flowers of catclaw vine.

Courtesy Roger B. Thompson



Study reveals that the forty-odd genera of vines mentioned in the articles in this issue belong in nearly thirty separate plant families. Some of these families contain only one climbing representative, whereas others are made up almost entirely of vines.

PEA FAMILY (*Leguminosae*). A very large family with several thousand species of world-wide distribution, exhibiting all types of habit. Here are found such plants as peas, beans, locusts, redbud, silk tree, and clovers.

Wisteria	Sweet pea
Kudzu vine	

GRAPE FAMILY (*Vitaceae*). A family of about five hundred species found in temperate and tropical regions. Nearly all are vines, though a few are shrubs or small trees.

Boston-ivy	Ampelopsis
Grape	Virginia creeper

ROSE FAMILY (*Rosaceae*). Perhaps thirty-two hundred species of herbs, shrubs, trees, and vines of temperate regions, including such economic plants as apples, cherries, strawberries, spiraea, and cotoneasters.

Cherokee rose	Memorial rose
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BIGNONIA FAMILY (*Bignoniaceae*). A family of about six hundred trees, shrubs, and vines of tropical and temperate regions. Here belong the catalpa and the tropical jacaranda.

Trumpet creeper
Cross vine
Catclaw funnel creeper
Mexican blood trumpet vine

SAXIFRAGE FAMILY (*Saxifragaceae*).
About a thousand species, of very variable habit, found mostly in temperate regions, some in the Arctic. Here are found such economic plants as gooseberries, currants, saxifrages, and hydrangeas.

Climbing hydrangea

Pileostegia

Japanese hydrangea-vine

STAFF-TREE FAMILY (*Celastraceae*).
About four hundred species of trees, shrubs, and vines of wide distribution.

Bittersweet

Tripterygium

Euonymus

KNOTWEED FAMILY (*Polygonaceae*).
Some eight hundred species of trees, shrubs, vines, and herbs of wide distribution. Rhubarb, dock, and buckwheat belong in the family.

Silver fleece vine

Mountain rose coral vine

Wire vine

NIGHTSHADE FAMILY (*Solanaceae*). Two thousand species of various habit in temperate and tropical regions. Such plants as the potato, tomato, tobacco, and petunia belong here.

Nightshade

Matrimony vine

MULBERRY FAMILY (*Moraceae*). Mostly tropical plants of about a thousand species, including herbs such as marijuana and trees such as fig and mulberry.

Climbing fig

GINSENG FAMILY (*Araliaceae*). Half a thousand species of herbs, shrubs, vines, and trees of world-wide distribution.

English ivy

MAGNOLIA FAMILY (*Magnoliaceae*). About eighty species of woody plants in tropical and temperate parts of Asia and North America.

Magnolia-vine

Scarlet kadsura

MORNING-GLORY FAMILY (*Convolvulaceae*). Mostly twining herbs but also shrubs and trees of a thousand species found around the world.

Morning-glory

BUTTERCUP FAMILY (*Ranunculaceae*). Herbs, shrubs, and vines of fifteen hundred species in the Northern Hemisphere.

Clematis



McFarland

Carolina yellow jessamine.

CASHEW FAMILY (*Anacardiaceae*). Trees, shrubs, and vines of about four hundred species, found in tropical and temperate regions. Cashew, pistachio, and sumac belong here.

Poison-ivy

MADDER FAMILY (*Rubiaceae*). Five thousand species of tropical and temperate trees, shrubs, herbs, and vines. Here are included coffee and the bedstraws.

Firecracker vine

VERBENA FAMILY (*Verbenaceae*). Tropical and subtropical herbs, shrubs, and trees in thirteen hundred species, with such garden plants as verbenas, chaste tree (*Viter*), and beauty-berry.

Glorybower

MILKWEED FAMILY (*Asclepiadaceae*). Two thousand species of herbs, shrubs, and vines of wide range.

Silk vine

BIRTHWORT FAMILY (*Aristolochiaceae*). Two hundred species of herbs or woody climbers found in warm regions of the world.

Dutchman's pipe

LARDIZABALA FAMILY (*Lardizabalaceae*). A small temperate-climate family of only twenty vines.

Akebia

PHLOX FAMILY (*Polemoniaceae*). About three hundred species, mostly herbs, found in Europe, Asia, and America. Here are found phlox, gilia, and Jacob's ladder.

Purple-bell cobaea

PASSION-FLOWER FAMILY (*Passifloraceae*). Herbaceous and woody vines comprising over five hundred species in warm and tropical regions.

Passion flower

ACTINIDIA FAMILY (*Actinidiaceae*). About three hundred species of trees, shrubs, and vines, mainly in tropical regions.

Actinidia

LOGANIA FAMILY (*Loganiaceae*). Tropical and warm-temperate plants of various habit of about four hundred species. Butterfly-bush (*Buddleia*) is the best known.

Carolina jessamine

HONEYSUCKLE FAMILY (*Caprifoliaceae*). A north-temperate family containing

about four hundred species, with such economic plants as weigela, viburnum, and elder.

Honeysuckle

DOGBANE FAMILY (*Apocynaceae*). More than a thousand species of plants of various habit and wide range.

Periwinkle

Star-jasmine

ACANTHUS FAMILY (*Acanthaceae*). About two thousand species of tropical and temperate plants, including shrimp plant and *Jacobinia*.

Bengal clock vine

MOONSEED FAMILY (*Menispermaceae*). Woody vines or trees or shrubs of mostly tropical distribution. About two hundred species.

Common moonseed



VINES WITH SEXES SEPARATE

Male plants never fruit; female plants fruit if males are sufficiently near

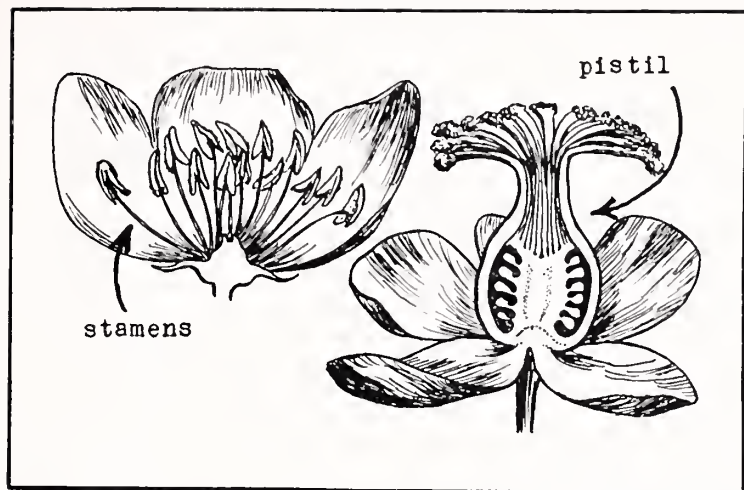
Donald Wyman

THERE are at least five kinds of vines with sexes separate, that is, with the pollen-bearing (male) flowers on one plant and the pistil-bearing (female) flowers on another plant. It is only these pistillate flowers that develop into fruits, and usually they do so only if a male plant is in the near vicinity to supply the pollen. The five genera of vines in this group are *Actinidia*, *Celastrus* (bittersweet), *Schisandra*, *Smilax* (cat brier) and *Vitis* (grape).

From the standpoint of ornament, the bittersweets are the most important of all; because of their bright orange fruits they are among the most popular of all fruiting vines. Many people have been disappointed because carefully grown bittersweet vines, in a prominent garden spot, have never borne fruits over the years. This has been either because a

male (or staminate-flowering) vine was planted—which will never have fruits under any circumstances; or because a pistillate (or potentially fruiting) vine has been planted, with no near-by source of pollen from male plants to fertilize the pistillate flowers when they are in bloom.

We have experimented with bagging these flowers when they bloom and we know that in the case of bittersweet at least, pollen is necessary for fruiting. Experiments at the Arnold Arboretum have shown that pollen from male plants is carried by the wind or by insects nearly a quarter of a mile, though how much farther we do not know. There are three possibilities available to the home owner to insure the fruiting of his bittersweet vine, providing of course, he has bought a vine that either has fruit on it or is



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Flowers of actinidia—left, male; right, female. From Gundersen, Families of Dicotyledons.

guaranteed to be a fruiting plant.

1. A small male plant can be planted in the same hole with the fruiting plant. This will have to be kept restrained somewhat, over the years, so that it does not grow more vigorously than the fruiting plant.

2. When the vine begins to flower, a bunch of branches with pollen-bearing flowers can be collected from the wild or from a known male plant, placed in a bottle of water, and hung up high in the pistillate vine. Wind and insects will do the rest, but the flowers should be in good condition for several days at least. I have done this very successfully, but the trick is to obtain the right flowers at just the right time. They usually bloom about June 10 in the vicinity of Boston.

3. The best way of all for gardeners with talent for experimentation is to bud a few buds from a staminate plant on the fruiting plant. This is easily done, with a little practice, after reading about budding in any well illustrated book on plant propagation (see PLANTS & GARDENS, Summer 1951, pp. 104-105); it should be done in August. Of course the branches that develop from such buds should be clearly marked so that they will not be pruned off. It may well be that scions

could be grafted on the fruiting plant in the early spring instead, but the budding is simple and easily done.

The fruits of the **bower actinidia** (*A. arguta*) are not ornamental, hence are not desired unless one is interested in making preserves from them. If fruits are desired, the same possibilities are open as for bittersweet.

Magnolia-vine (*Schisandra*) has very attractive fruits (red, in pendulous clusters), but it is rarely used in this part of the country. The Chinese species, which is hardy here, bears its fruits well hidden by foliage, so that it is really not considered a desirable fruiting ornamental.

Smilax, because of its many thorns, is seldom planted as an ornamental.

Most of the **grapes** (*Vitis*), especially the ones grown for their fruits, have both kinds of flowers on the same plant. A few of the species grown for ornament have sexes separate, but in these cases the fruits are not usually desirable.

It should be specifically noted that **wisterias** are definitely NOT in this group. They sometimes fail to flower and fruit for other reasons; but their flowers are perfect, and all wisteria vines should eventually bear the flowers to which we are accustomed (see page 70).



Chinese wisteria trained in bush form.

Buhle

FLOWERING IN WISTERIA

Why wisteria may fail to flower and some pointers on what to do about it

Harold O. Perkins and Donald Wyman

WISTERIA stands out from all the other vines as sometimes proving the most troublesome to bring into flower. Horticulturists receive many a query about vines that are 10 to 14 years old and have "never flowered." Some ask about the sexes of the plants, and others about where to buy plants guaranteed to flower. The answers to these questions are not as simple as they might be, but here are a few pointers about wisterias.

Sex Separation Not a Factor

Each flower of wisteria is hermaphroditic (both sexes present in the same flower); there is no such thing as separate

male and female wisteria vines (as there is, for example, in bittersweet). Moreover, this factor affects only fruit production, not blossoming, so in any event it would not affect the ability of wisteria to bloom. Given the right conditions, all wisterias should flower. Admittedly the fact is that they do not all flower; some of them fail to do so for many years.

Age of the Plant

In some cases all that may be necessary is to wait a few years; wisterias often take about seven years to reach a flowering stage. In one instance a Japanese and a Chinese wisteria grew side by side. The

Chinese vine bloomed beautifully every year, according to the owner, but the Japanese vine had never bloomed. At the time they were observed the Chinese vine was covered with flowers and a short time later the Japanese vine also had a few flowers. The owner said this was the first time in fifteen years that it had bloomed, but it might have bloomed sparsely before, unnoticed.

Over-fertilization

Heavy fertilizing, and especially an excess of nitrogen, results in heavy stem and leaf growth. This discourages flower bud formation. A plant which has an abundance of dark colored, healthy foliage should, therefore, receive a no-nitrogen fertilizer, or no fertilizer at all.

Fertilizing with superphosphate is permissible and often desirable. A good way to do this is to dig a 2-foot trench about the base of the plant and mix a considerable amount of superphosphate with the soil as it is returned to the trench.

Root Pruning

Applying superphosphate as above described serves a dual purpose. It supplies the feeding roots with an excess of phosphoric acid which may hasten flowering and in the same operation it accomplishes root pruning. The latter may also be carried out by forcing a sharp spade into

the soil in a circle about the plant, thus cutting all the side roots.

Branch Pruning

If a plant shows excessive growth vigor, i.e., rapid production of stems and leaves, the long shoots may be pruned back to two or three buds in the late spring. Repeat this pruning every other week until growth stops. This may help but is not a sure cure.

Climate

In the colder areas of the United States and southern Canada severe winters can kill flower buds, so that no amount of pruning or proper fertilizing will help flower production. In such places the vines should be taken down for the winter and covered with hay, brush, or soil, as is commonly recommended for rambler roses.

There is some evidence that sunlight is essential for flowering, so do not plant wisteria in the shade.

Purchasing Plants

Some commercial growers believe that certain clones are notably good flowering specimens and they always propagate from these. It is well to buy such plants, if available. Other nurserymen tie a knot in the young stem and claim that by so doing they make the vine certain to flower. Potted plants that have already flowered are sometimes available.

WISTERIA MAY NOT FLOWER BECAUSE:

- 1) Plant is not old enough
- 2) Too rich soil (too much nitrogen) leads to excessive stem and leaf growth but no flowers
- 3) Winter cold (in northern areas) may kill flower buds
- 4) Root and top growth are out of balance
- 5) Insufficient sunlight

TO HELP INDUCE FLOWERING:

- 1) Wait a few years
- 2) Do not apply nitrogen fertilizers; apply superphosphate
- 3) Protect by taking down and covering in winter
- 4) Prune branches severely; root prune
- 5) Do not plant in shade

DUAL-PURPOSE VINES

For edible fruits and ornamental value

George L. Slate

GRAPES and actinidias are dual-purpose vines that are handsome ornamentals as well as producers of excellent fruits. Gardeners may well explore the possibilities of the many species and varieties of grapes that can contribute fruit as well as beauty to the home landscape. Grape vines, especially of the CONCORD variety, have long been a common feature in American back yards, but actinidias, with their good fruits and handsome disease- and pest-free foliage, are well worth a place in the garden.

Grapes

Grapes are commonly grown as shade for porches, or on the sides of barns or garages. Other uses are as shade for arbors or as screens on fences and stone walls. Where these structures are not available, a large trellis clothed with grape foliage makes an attractive and dense screen. In the wild garden the species may scramble to the tops of tall trees and bear fruit for the birds or for jelly.

The wild grapes are useful chiefly for their beauty, but the birds can make use of the fruit.

The "noblest of all the grapevines" according to E. H. Wilson is *Vitis coignetiae* (*V. kaempferi*) a native of the colder parts of Japan. A vine of great vigor, it climbs to the tops of trees 60 feet tall and makes an impenetrable jungle on the margins of woods and swamps. The feature of this grape that makes it a valuable ornamental is the large heart-shaped leaves, often more than a foot across,

which turn brilliant scarlet and crimson in the fall.

The vine-covered trees and shrubs of the edges of woodland and fence rows are one of the features of the American landscape that is much admired by visitors from Europe. The great vigor of these wild grapes enables them to take care of themselves as soon as they are established.

The native American grapes of the temperate zone come in many species but only a few are good and distinctive enough to plant as ornamentals. Doan grape (*V. doaniana*), native to Texas but hardy in the northern states, is a vigorous plant with large, thick, pale bluish-green leaves which give the plant a distinctive appearance. Sweet winter grape (*V. cinerea*), another southwestern grape, is also attractive and worth growing.

The riverbank grape (*V. vulpina* or *V. riparia*) is the commonest species in the Northeast where it decorates the fence rows, edges of woodlands, and riverbanks, and often comes up as a weed in the garden. It is a very vigorous attractive vine with glossy green leaves, and the fruits are useful for jelly and for the birds. Summer grape (*V. aestivalis*), another native, is equally attractive and clambers over the trees at the edges of woodlands. The native fox grape (*V. labrusca*) is another rampant occupant of woodland trees. Its berries are large and possess to a strong degree the characteristic flavor and aroma described by grape fanciers as "foxy." Many of its descendants, either pure *V. labrusca*

Many grapes, in addition to their edible qualities, possess ornamental value.



McFarland

or hybrids with the Old World grape *V. vinifera*, are the principal grapes grown in American vineyards outside of California. The famous CONCORD and NIAGARA varieties are near *V. labrusca* types.

Viticulturists have selected some very vigorous phylloxera*-resistant types that are used as root stocks on which to graft phylloxera-susceptible varieties. These might well be planted where vines of unusual vigor are desired. RIPARIA GLOIRE and No. 3309 are two of the many root stocks known to viticulturists.

The **cultivated grapes**, with their superior fruits, might well be used in place of the wild grape species for dooryard trellises or boundary fences, and even on porches and arbors. Since spraying may be necessary, varieties that can get along without too much spraying should be chosen for planting on buildings. CONCORD and NIAGARA are suitable, but even these may need spraying in some years in some areas.

Grapes to be grown for fruit as well as ornament should receive full sunlight

all day long. Vines in partial shade will not bear heavy crops. Vines grown on the south sides of buildings or fences benefit from the reflected heat which may materially advance the ripening date of the fruit; this is a distinct advantage with late varieties in regions where the growing season is a few days too short.

Grapes grown for ornament as well as fruit production must receive regular annual care and not be left to shift for themselves. Cultivation and fertilization of the soil, training, pruning, and spraying are all essential if good results are to be obtained.

Vines to be grown on an arbor or pergola should be planted 6 feet or more apart. The fan system of training is suitable for the arbor. The vine is allowed to branch near the ground and the branches are trained in a fan-shaped manner to form the framework of the vine. The shoots that grow from the buds should be directed over the arbor and tied in order to secure uniform coverage by the foliage.

Where an **overhead cover** is desired a strong cane to form the trunk is carried to the top of the support and fastened securely. Two laterals, one in each direction, are extended from the head of

*A small, destructive insect (aphid) that attacks the leaves and roots of grape vines.

the trunk and tied to the support. Shoots developing from these laterals gradually cover the overhead trellis.

Pruning Grapes for Fruit Production

Regular and systematic **pruning** is necessary if satisfactory crops of fruit are to be produced. It is essential that the size of the crop be adjusted to the capabilities of the vines. If the vines are permitted to overbear, they will be weakened and the fruit will not ripen well, whereas underbearing may result in poor clusters and light crops.

The vine may be pruned as follows. All of the one-year wood on a vine of average vigor is removed in the spring except six 10-bud canes. The one-year prunings are tied in a bundle and weighed. The number of buds left on the vine is then adjusted to the weight of the prunings, 30 buds being left for the first pound and 10 buds for each additional pound of prunings. This method is much superior to the judgment of unskilled persons, in fact even skilled pruners do much better work with it.

There are many fine fruiting **varieties** of grapes that may be used for ornamental purposes. CONCORD, NIAGARA, and DELAWARE are well known and do very well on arbors or the sides of buildings or porches. Some very early CONCORD types are VAN BUREN and FREDONIA. Early green grapes are ONTARIO, PORTLAND, and SENECA. Midseason varieties are BUFFALO, blue, and DUNKIRK, red. Late-ripening good-keeping sorts are SHERIDAN, blue, YATES, red, and STEUBEN, blue. GOLDEN MUSCAT is a vigorous golden colored grape of superior quality for long seasons.

Actinidias

Actinidias are vigorous vines, natives of eastern Asia, esteemed for their handsome foliage which is variegated in some species. Several species bear edible fruits of good quality, for which they are worth a place in a large garden.

Bower actinidia (*A. arguta*) is a common plant in Japan, Manchuria, and

northern Korea, where its fruit is collected and eaten by the natives. The greenish fruits are about an inch long, rather soft, and full of tiny seeds* which are not noticeable when the fruit is eaten. The flavor is sweet and distinct, and to some it suggests the fig.

The vine is a **hardy and very vigorous** grower which may be used wherever strong-growing vines are needed. It climbs by twining stems and a plant will cover a trellis 20 feet long and 10 feet high in two or three years. In the vicinity of Bar Harbor, Maine, it is clipped to form dense attractive hedges. The leaves are a beautiful dark glossy green, 2 to 5 inches long, 1½ to 3 inches broad, and borne on long reddish petioles. The foliage is not troubled by diseases.

The small saucer-shaped **flowers** are of two kinds, one male, the other perfect (having both male and female elements), the latter being on the fruit-producing plants. They are small, and white with a mass of yellow stamens.

A tender species. *Actinidia chinensis*, sometimes called Chinese gooseberry although not related to the gooseberries, is the handsomest of the genus; in fact, it is described by E. H. Wilson as one of the most beautiful of all climbing vines. A native of the Yangtze valley in China, it is hardy in this country only in California and in other areas where citrus fruits are grown.

The vine is very vigorous, with large, round to ovate leaves and attractive large, deliciously fragrant white flowers which fade to buff-yellow. The young shoots and leaves are covered with crimson hairs which add much to the beauty of the plant.

The **fruit** is about the size of a hen's egg, russet-colored, hairy, very thin-skinned, with a sweet characteristic flavor, described as tasting something like a gooseberry, but with other flavors.

*The Botanic Garden will collect seeds of *Actinidia arguta* and *Akebia quinata* this fall for distribution to those who request them. Send stamped envelope.

Flowers of bower actinidia.



Buhle photos

Actinidia kolomikta, a native of northern China, Manchuria, northern Korea, and eastern Siberia, grows in dense masses in open forests, covering large areas, crawling over boulders and smothering small shrubs. It produces edible fruits.

The charm of this plant is its **handsome foliage**. Some plants produce leaves that are either entirely or partially white or silvery colored, or they may be spotted. Others show a similar variegation, but in red or rosy tints.

Actinidia polygama, from Manchuria, Saghalin, and Hokkaido, is also distinguished for its handsome foliage. The leaves near the ends of the branches of the staminate plants become silvery white or yellowish over the entire surface, or some-

times only on the upper half. From a distance the plants in the wild appear like huge bushes covered with pale yellow flowers.

The stems are weak, so the plants do not climb into tall trees in the wild, but they tumble about and make great tangles sometimes 20 feet across and 15 to 20 feet high.

The staminate (male) plant possesses an irresistible attraction for cats; according to one authority, "it outeatnips catnip." This necessitates protecting the plants with a cat-proof fence. The flowers are the size and color of orange blossoms and are sweetly perfumed but are hidden in the foliage. The fruit is edible but less desirable than other actinidia fruits.

Fruit of bower actinidia.





McFarland

Cardinal-climber illustrates the usefulness of annual vines in providing quick cover.

ANNUAL CLIMBERS

How to grow some of these useful and attractive vines

Alys Sutcliffe

MOST people are familiar with morning-glories as annual vines that grow quickly and flower prolifically if grown in a sunny place. They are useful plants to cover an unsightly fence or a bare wall.

There are several other annual vines which may be used for this purpose. They are easy to grow, some more so than others, and they usually flower well if planted in a sunny position. Some prefer rich soil with plenty of fertilizer and water, but some actually grow better in poor soils. This means that anyone can grow one or two annual vines that will flower most of the summer and fall until frost.

The following list of these vines and their culture may be helpful to the new home owner with a wire fence or garage wall that he would like to beautify until some perennial vines are established.

Canary-bird vine (*Tropaeolum peregrinum*) has attractively cut leaves and yellow flowers, and will grow well in shady places. Seed can be sown out-of-doors when the ground is warm.

Nasturtium (*Tropaeolum majus*). The climbing varieties of the garden nasturtium will grow in full sun in any sandy or gravelly soil, preferring this to a rich, heavy mixture. They should be sown out-of-doors as soon as the ground warms up

a bit. Black aphids will infest them unless they are sprayed regularly with nicotine sulphate or some equally effective trade-name spray; even soapy water helps to keep them free of these pests.

The **morning-glory family** includes several species that have well-known climbers among them, including the obnoxious bind-weeds (*Convolvulus arvensis* and *C. sepium*). DO NOT PLANT THESE.

The following are worth-while vines:

Cardinal-climber (*Quamoclit sloteri*) is a strong and rapid grower with bright red flowers and fern-like foliage. Sowing can be done out-of-doors about the beginning of May. The seed should first be soaked in water for a few hours.

Moonflower (*Calonyction aculeatum*), a night-blooming morning-glory, has large, white, sweet-scented flowers that open in the early evening and fade towards morning. Although it is perennial in the tropics, it is treated as an annual in the North. There is a pink variety, also.

There are now several very good varieties of **morning-glories** (*Ipomoea*) including GIANT CORNELL with large red flowers that have a white border; PEARLY GATES, a white variety; and DARLING, wine-red with a white throat. SCARLETT O'HARA and HEAVENLY BLUE are old favorites. Clarke's early-flowering variety of HEAVENLY BLUE might come into flower sooner than often happens with morning-glories. All make plenty of strong growth and cover a fence quickly, but do not flower until late summer. Once they begin, they go on until frost. This is all right if you are away most of the summer and come home to find plenty of color in your garden, but it is disappointing if you plant morning-glories in your summer garden and have them start to flower just as you are about to leave at the end of the season.

Purple-bell cobaea or cathedral bells (*Cobaea scandens*) is a rapid-growing vine with purple bell-shaped flowers. The seeds are flat and should be put into the ground edge-wise. In the South this is perennial.

Hop-vine (*Humulus japonica*) will make a quick cover for a fence. The leaves are quite handsome.

Gourds for ornament are popular because they can be used for winter decorations. Most of them will grow over any garden fence. They need good soil, plenty of water and well balanced fertilizer. The seed may be sown as soon as all danger of frost is over. When the plants begin to grow, a mulch will help to keep the roots cool and moist. The fruits should not be picked until the shells are hard, then they should be cut off with as much stem as possible. Wash the gourds with a soft brush dipped in some phenol disinfectant such as Lysol or Sylpho-Naphthol and leave them to dry. In three or four days they may be waxed or varnished.

Sweet pea (*Lathyrus odoratus*). We are always hopeful that these will be worth the trouble they take, but except in special situations and for unexplainable reasons, they seldom are. For those who can succeed with them, they are superb annual climbers. They lend color and fragrance to the garden and are fine

HEAVENLY BLUE morning-glory.

Roche





Turk's cap gourd.

McFarland

for cutting. They need a deeply-trenched rich soil and cool weather. In the fall dig a trench about 18 inches deep, put 9 inches of well-rotted manure in the

bottom, and over this put 6 inches of good soil into which a complete fertilizer has been mixed. Sow the seed in November and cover with about 2 inches of soil; then fill the trench with a light mulch of leaves or evergreen branches which can be removed in the spring. Sweet peas need plenty of water and should be picked daily; once they go to seed the vines soon begin to turn yellow.

General Tips on Culture

To get an early start, morning-glories and other annual vines may be sown in pots indoors. It is preferable to use some of the treated pots now on the market; these can be put into the ground, plants and all, without disturbing the roots. Use a light, porous soil and soak the seeds before sowing. They should not be sown out-of-doors until the soil is warm. As soon as, or even before, the seeds start to grow, it is important to have something for the vines to climb on so that there is no chance of their getting bent and broken. This is often the cause of failure with annual vines and is easily remedied by putting twigs in the pots or around the plants until they reach the fence or lattice over which they will eventually climb.

McFarland

Sweet pea.

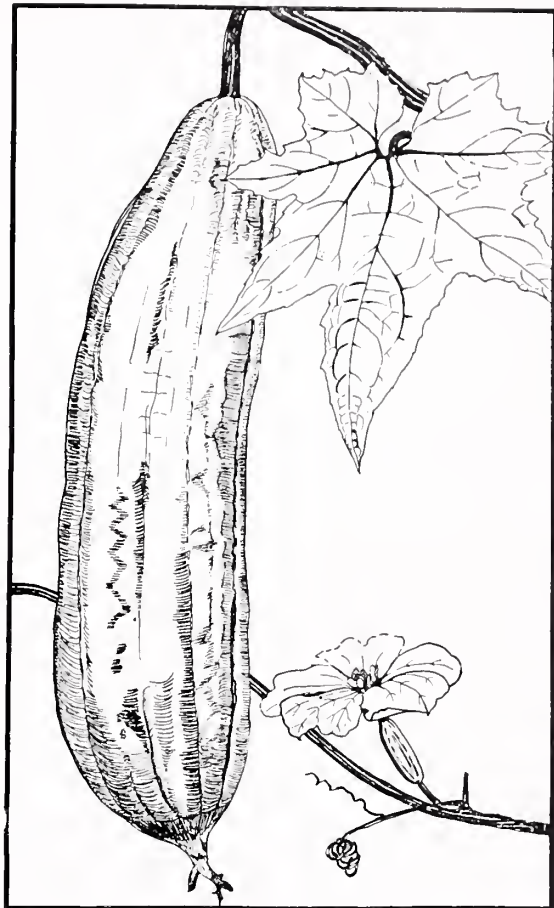


DISHCLOTH GOURD

The dishcloth gourd, also called vegetable sponge, is an interesting curiosity, used to some extent commercially. The long slender fruit has a fibrous interior that furnishes a satisfactory sponge-like material when it is dried and the seeds are removed. In some parts of the world young fruits are eaten as a vegetable. The fruit itself is not as colorful as are most gourds, but the yellow flowers, which may be five inches across, are quite showy. The vine makes a useful late summer screen.

There are several species, *Luffa cylindrica* being the most commonly grown. It can be grown in the northern United States, but needs a long growing season to fruit abundantly.

The plants are not demanding, but like full sun. Culture is much the same as for cucumber or melons.



By permission of the Macmillan Co.
Dishcloth gourd (*Luffa cylindrica*). From
Bailey, *The Garden of Gourds*, copyright
1950.

The "dishcloth" of the dishcloth gourd.

Buhle





Buhle photos

The terrace setting for the Brooklyn Botanic Garden's exhibit of miniature gardens at the International Flower Show.

WITHIN THE BROOKLYN BOTANIC GARDEN

FLOWER SHOW EXHIBIT

"MINIATURE gardens for limited space and busy people" were featured in the Brooklyn Botanic Garden's exhibit at the International Flower Show in New York, March 7 to 13. The diminutive gardens, designed to suit many tastes and situations, were shown in a modern penthouse terrace setting. The

terrace could equally well have belonged to any urban or rural home. Included among the gardens were rock gardens, a bog garden, a lily pool, a woodland garden, and a formal rose garden. The fascinating plants growing in them were in perfect scale with their settings and ranged from tiny blossoming primroses to miniature evergreens. A group of indoor gardens contained small cacti and other succulents—plants which thrive in the dry, warm air of the average apartment.

Many of the plants used in these miniature gardens were not naturally dwarf species; to keep the miniature scale, replacements are necessary from time to time.

An article on miniature gardens will appear in a future issue of *PLANTS & GARDENS*, by Miss Alys Sutcliffe, whose inspiration it was to make and exhibit them at the New York Flower Show.

A miniature garden on a tufa rock.



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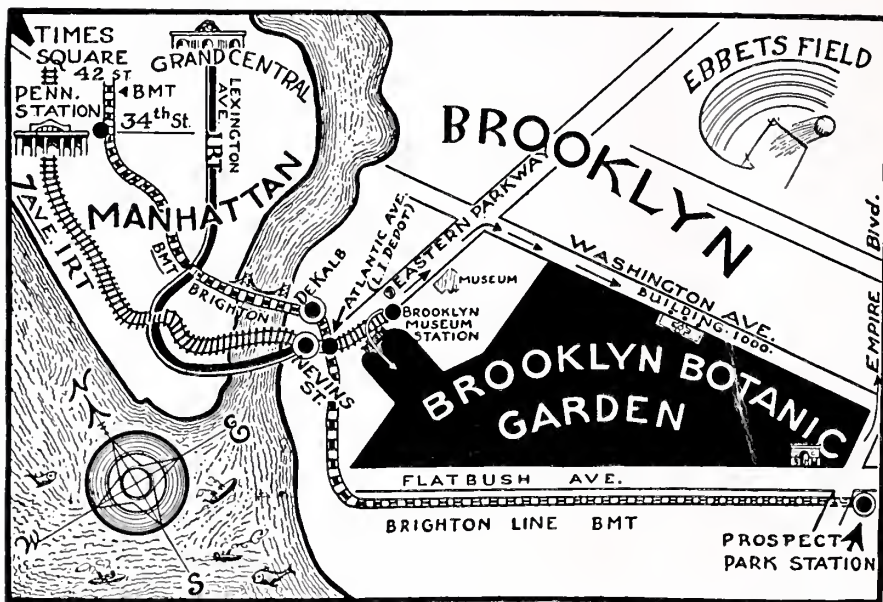
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By Subway

B.M.T. (Brighton Beach line) downtown express or local to Prospect Park Station.

I.R.T., West Side (7th Avenue or Broadway-7th Avenue line) downtown express marked "New Lots Avenue" or "Flatbush Avenue," to Eastern Parkway-Brooklyn Museum Station.

I.R.T., East Side (Lexington Avenue line) downtown express marked "New Lots Avenue" or "Utica Avenue" or "Atlantic Avenue," to Nevins Street; step across platform and change to 7th Avenue or Broadway-7th Avenue train, ride to Eastern Parkway-Brooklyn Museum Station.

By Bus

Flatbush Avenue bus to Empire Boulevard

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By Automobile

From Long Island, take Eastern Parkway westward, and turn left at Washington Avenue.

From Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway; follow the Parkway to Washington Avenue, then turn right.

BROOKLYN BOTANIC GARDEN RECORD

PLANTS & GARDENS

SUMMER
1954

Paved Terraces

Walks and Paths

Walls

Fences

Garden Pools

Fireplaces

Arbors

Benches



NEW SERIES

VOL. 10

NO. 2

AMONG THE CONTRIBUTORS TO THIS ISSUE

HENRY B. AUL, Assistant Horticultural Editor of the New York *Herald Tribune*, author of *How to Build Garden Structures* and *How to Beautify and Improve Your Home Ground*.

MARY DEPUTY CATTELL of New York City, landscape architect and author of *Gardening with Shrubs and Small Garden Trees* and *Garden Housekeeping*.

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PLANTS & GARDENS

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Summer 1954

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Editorial

MARY DEPUTY CATTELL, *Guest Editor*

PETER K. NELSON, *Associate Editor*

and the Editorial Committee of the Brooklyn Botanic Garden

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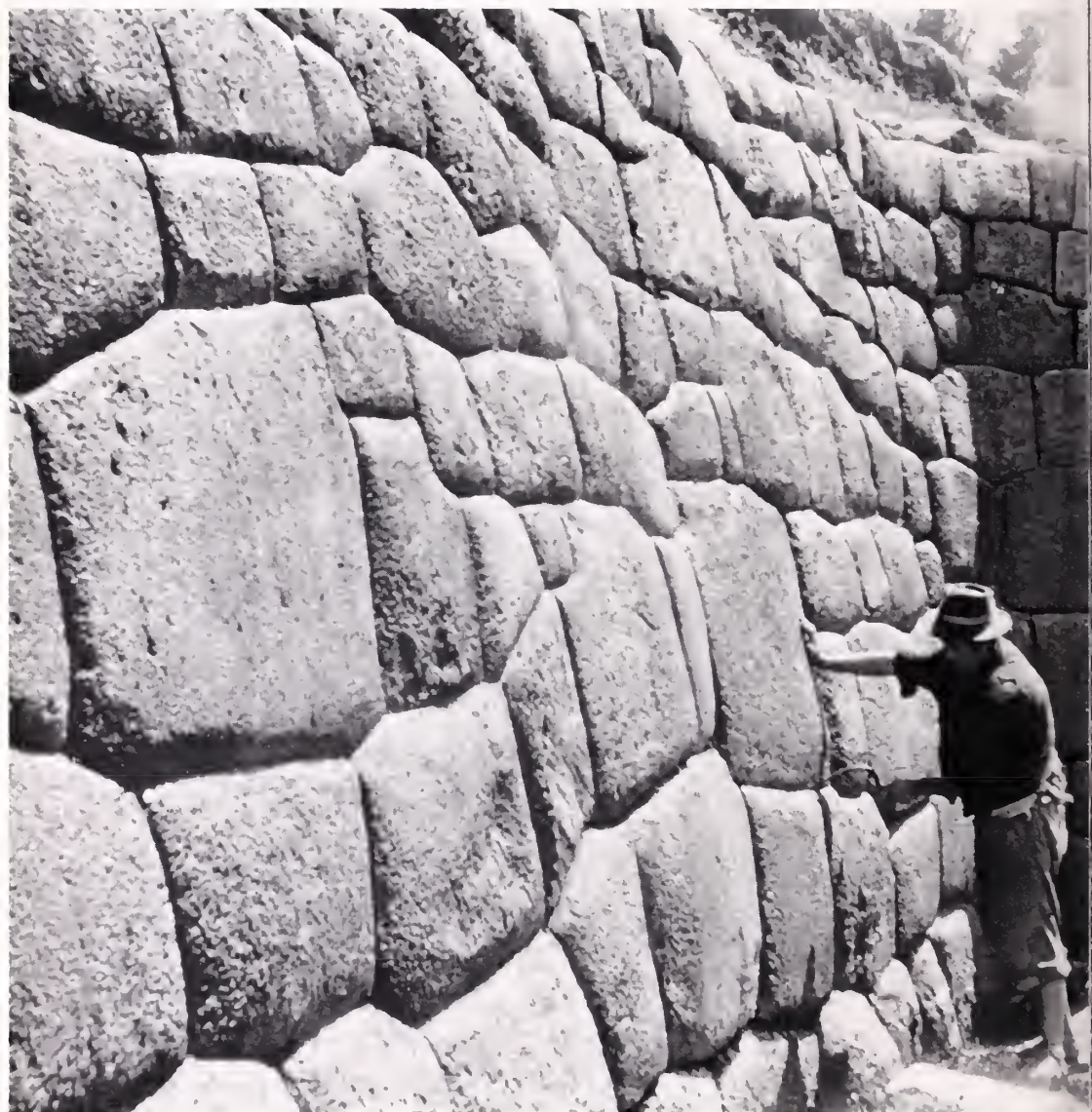


Photo courtesy Dr. Adrian Van Sinderen

Wall of an Inca ruin near Cuzco, the most ancient city in Peru. These walls, built of stones perfectly fitted together, without mortar, are marvels of the stone mason's art.

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Summer 1954

The amateur with brush and pigments who almost overnight becomes an artist is rare indeed. Almost as rare is the amateur who can create a really fine garden without experience. More and more people realize this and are seeking information that can lead to better gardens. The warm welcome given last year's summer issue of *PLANTS & GARDENS* (American Gardens, a Source Book of Ideas) is ample evidence that there is a growing desire for a wider knowledge of choice ornamental plants and for intelligent planning of the garden that will result in enhanced beauty, increased usefulness and easier care.

The present issue is a practical guide-book on garden structures, assembled by Guest Editor Mary Deputy Cattell; it represents the cumulative experience of experts in methods of building garden structures and good taste in their use. Not everyone will choose the same kinds of things but all will wish to have structures in harmony with the garden pictures they are trying to create.

As this goes to press, I expect to be in the Atlas Mountains in Morocco, on the fringe of the Sahara Desert; and following this, I shall represent the Botanic Garden at the VIIIth International Botanical Congress in Paris, in July. More about some of these experiences in the future.

Sincerely,

A handwritten signature in dark ink, reading "George S. Perry, Jr." in a cursive script.

Director



Gottschö-Schleisner photo

A terrace of well-proportioned random rectangular flagstones. The joints are a little wide; narrower ones would permit easier maintenance.

PAVED TERRACES

Garden space for open-air living

ALMOST every property today, whether large or small, includes one or more areas designed for comfortable outdoor living through many months of the year.

Choice of Material

Grass is suitable for terraces which receive little rough use, but these "outdoor living rooms" must usually be surfaced with some other material, both for ease of upkeep and for comfort. Paving may be flagstone, native stone, brick, concrete, wood, or gravel. The choice of material depends largely on the location of the area (that is, whether it is immediately adjacent to the house, in the garden, or in a secluded corner of a wooded property), on the availability of local materials, and on the particular use to which the area is to be put.

Flagstone or concrete paving is usually the most formal in appearance and is particularly suitable immediately adjoining a house, where the feeling of the terrace is architectural or where the surface will get very hard wear.

Brick of pleasing texture and color is equally good near the house and is, when weathered, a little more subtle in color and more attractive for informal or traditional houses. It is well adapted also for terraces in the garden or under big trees, where the mellow shadings of weathered brick are less conspicuous than the colder gray of stone.

In parts of the country where the climate permits, sections of log form most interesting patterns and are particularly fine for informal gardens or for the wilder areas of the place. They are

usually less permanent than stone, concrete, or brick, but also less expensive to install.

Where expense is definitely a factor, paved areas of **gravel**, if properly built, are satisfactory. They are not practical where heavy furniture is to be placed, as it almost inevitably digs into the gravel surface; and they are not well chosen for safety where small children are to play.

The **expense of installation** depends on the locality and the labor. In one section of the country brick may be cheap and flagstone very expensive. In another, they may be almost exactly the same price. The labor of laying the terrace with proper foundation is a large part of the cost, and if the owner can do it himself, the paving is likely to cost one-third to one-half less than a contractor's price.

Planting

Plant material near living terraces must be chosen with great care. Since there is likely to be constant use of the outdoor room, plants must be chosen for special attractiveness and presentability at the seasons when the terrace is used, and for their faculty of staying in bounds without encroachment on the terrace itself. Terraces that adjoin the house must, of course, have their planting in keeping with the architecture of the house itself and should usually have very few plants, but interesting ones that look well at close range.

Where the terraces adjoin lawns, there must always be a very carefully aligned firm edge so that hand clipping is not necessary along the edge of the terrace. This is particularly important with gravel or wood-block terraces in order to maintain tidiness and permanent form.

Wood paving on the floor contrasts well with the brick step and blends with a tall screen fence of wide boards.

L.A. Thomas Church

Baer photo





Gottschö-Schleisner photo

This detail of flagstone laid directly on earth shows the unkempt look of grass growing in wide joints.

As a general rule, it is wise to have as little plant growth as possible in the paved surface itself. Pads of grass in the joints of stone or brick require constant clipping and are dangerous to furniture and to ankles. Too many creeping plants underfoot make family and guests feel uneasy about moving freely in the area for fear of stepping on the plants. There are a few very low ground-cover plants suitable for terraces of native stone (which inevitably have rather wide joints) or of wood blocks. Creeping thyme (*Thymus serpyllum*), creeping speedwell (*Veronica repens*), and ground-ivy (*Glechoma hederacea*) will stand a considerable amount of trampling without complete destruction of the plants. All of them must, however, be used with discretion if the terrace is to be at all comfortable for constant use.

Construction Specifications

Flagstone paving. Flagstone should be random rectangular pieces in sizes varying from 1 foot in smallest dimension to 3 or 4 feet in largest dimension. Irregular or broken pieces look restless and are much harder to lay. The thickness must be uniform but may vary from $\frac{3}{4}$ inch in very mild climates to 3 inches in very severe ones. Flagstone $1\frac{1}{2}$ inches thick is usually most readily available and satisfactory.

In sandy soil or in climates where there is no frost the stones may be laid without foundations. The area should be excavated to the depth of the stone and leveled carefully. Any soft spots should be removed and the whole surface made smooth and uniform. Stones are then laid as described later. In heavy soil and for more permanently level surface



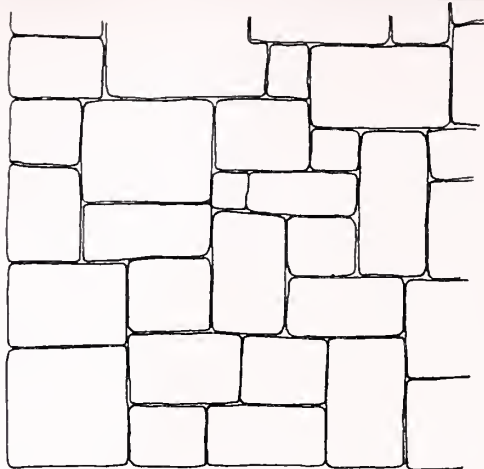
L.A. Alice Recknagel Treys

Buhle photos

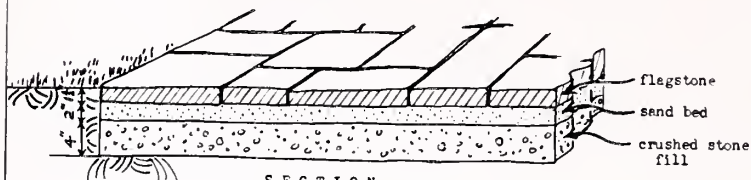
The terrace above, with heavy pads of grass in the joints of the flagstones has a cut-up, restless appearance.



Below, the same terrace without the grass is quiet and restful.



P.L.A.N

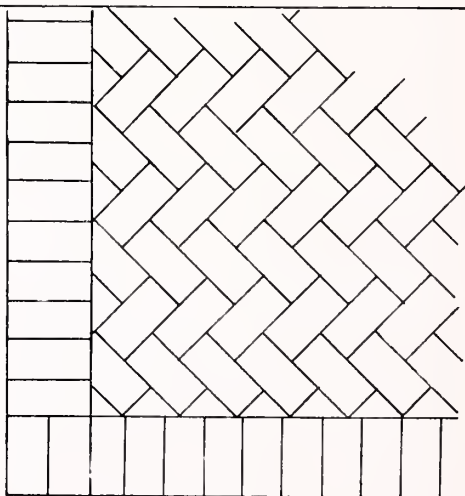


SECTION

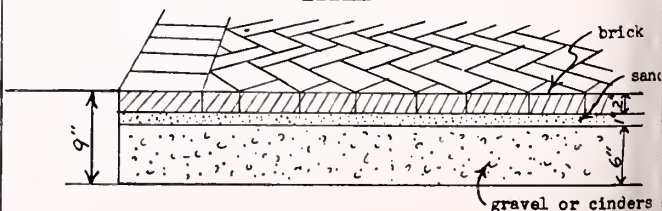
joints to be as tight as possible

Detail of random
rectangular flag-
stone laid dry.

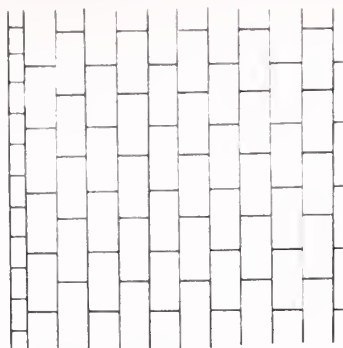
Detail of brick
paving.



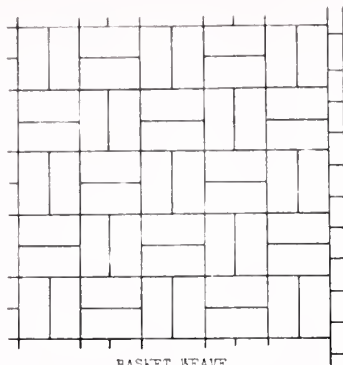
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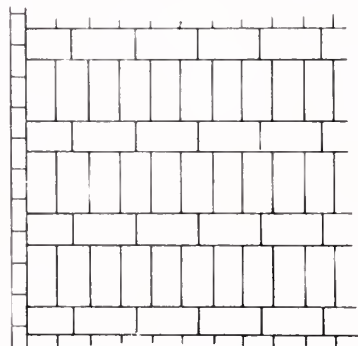


ALTERNATE LENGTHWISE STRETCHERS

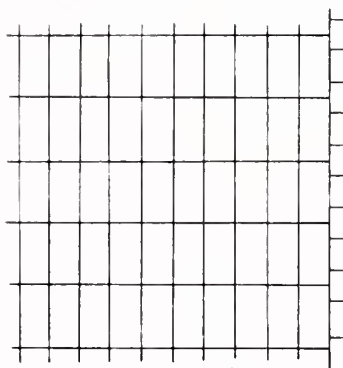


BASKET WEAVE

(modern brick laid in this pattern gives rather wide joints)



ALTERNATE LENGTHWISE AND CROSSWISE STRETCHERS



LENGTHWISE STRETCHERS

Various brick walk and pavement patterns.

in most climates a foundation of cinders and sand is advisable. A concrete base may be used but adds greatly to the expense and is not necessary.

The area is excavated to allow for 8 inches of foundation under the stone, *i.e.*, total depth of excavation for average $1\frac{1}{2}$ -inch stone is 9 to 10 inches. The subgrade must be tamped smooth and uniform, with a slight pitch—not more than 3 inches in 10 feet in any direction. On this subgrade place clean coarse boiler cinders or gravel, whichever is cheaper locally, flood with water and tamp or roll so it is about 6 inches deep and uniform. On this layer place enough clean sand to make approximately a 2-inch layer, after tamping and leveling to a firm surface. This should bring the surface of the sand to about $1\frac{1}{2}$ inches below the grade.

On this foundation the flagstones should be laid as tightly together as possible, with no wide joints. This prevents weeds and grass from coming up between the stones and gives a firm safe surface. After the stones are laid sand must be swept into all the joints and washed in, and this process repeated several times a week for a week or two to prevent the stones from shifting. The paving should have the same slight pitch of 2 to 3 inches in 10 feet that was established in the subgrade, to provide drainage.

Brick paving. The topsoil on the area to be paved is stripped off and piled in a convenient place for later use. The area is then excavated to a depth of 9 inches below finished grade. This subgrade is thoroughly tamped smooth and uniform.



L.A. Alice Recknagel Ireys

Buhle photo

Common brick laid on sand and cinders in herringbone pattern blends well with the foliage nearby.

Upon this subgrade a layer of clean boiler cinders or coarse gravel is spread about 6 to 7 inches deep. It is flooded with water and thoroughly tamped so that when completed it is 6 inches in depth.

On this foundation is placed a layer of fine sand, 1 inch in thickness. It must be carefully graded, wet, and tamped to make a good level surface for laying the bricks.

Bricks must be the type called selected common, hard-burned, and must be chosen for pleasant color and texture. Second-hand bricks when available are usually softer in color, but should be free of cement. The bricks are laid as close together as possible, with no joints, to give an even walking surface. After the bricks are properly laid, sand is spread over the surface of the paving and brushed into the joints to prevent any movement of the bricks.

Gravel paving depends for its success on painstaking construction, as careful as for a tennis court. The area is excavated to a depth of 6 inches and any soft material removed and replaced with suitably hard filler. The subgrade must then be rolled smooth and uniform.

On this subgrade lay a bed of clean hard broken stone, coarse gravel, or clean, coarse boiler cinders, whichever is cheaper locally. This should be deposited in two layers, each layer watered, rolled, and tamped till thoroughly compacted. This course, when completed, should be 2 inches below finished grade.

On this foundation spread gravel, varying in size from grits up to $\frac{1}{2}$ inch in largest dimension, with enough clay in it so that it will pack firmly. It should be deposited in $\frac{1}{2}$ -inch layers, each layer watered, tamped, and rolled until thoroughly compacted. A very thin layer, not more than $\frac{1}{2}$ inch, of local grits (fine gravel) may be spread over the top and rolled in thoroughly.

The edges should be defined by a row of sound hard common bricks laid on the 2- x 4-inch face, flush with the adjoining turf, if grass adjoins the paving, an inch above the soil if planting is next to the paving.

Concrete paving should be 4 inches thick, and in heavy soils or where drainage is poor should have a foundation of 6 inches of cinders or coarse gravel. The base, whether of soil or of drainage material, must be carefully leveled and



Gottschö-Schleisner photo

A neat, well-laid flagstone terrace easily maintained and pleasantly varied in color.

tamped firm. As concrete by itself is likely to be a little monotonous and cold, combining it with materials of other colors and textures makes a more interesting terrace. Brick, stone, or wood may be worked into the paving to form an edge or to give pattern to the entire area. These materials should be put in place before the concrete is poured, and can be used as forms for the work. If the terrace is to be entirely of concrete, a temporary form of wood, usually 1- x 4-inch boards, must be pegged firmly along the edges and other boards used to form expansion joints during the progress of the work. Spacing of the boards can vary but in general they should not be more than 3 feet apart.

Concrete should consist of one part cement, two parts sand, and three parts gravel. It should be poured in sections formed by either the permanent or the temporary dividers, and leveled off with a straight piece of board worked back and forth across the dividers. It is imperative to have the dividers perfectly level and in alignment if the terrace is to be of correct grade. The best-looking finish is usually obtained by letting the

concrete stand for four to eight hours, and then scrubbing with a stiff brush and cold water. This takes away the over-smooth look associated with city sidewalks, and brings variation in color from the kind of sand and gravel used. Further interesting color effects can be obtained, and the glare from too white paving avoided by adding color to the concrete, or using a colored crushed stone or brick for part or all of the gravel in the mixture. Great care should be used and a considerable amount of experimenting done, however, as it is easy to overdo color and get a garish terrace.

Concrete should be covered with wet burlap or straw as soon as it is hard enough on the surface to avoid sticking to the cover, and kept moist by frequent gentle sprinkling of the cover for a week or two. This is particularly important in hot sunny places. Concrete should never be poured when there is danger of hard freezing during the time it is hardening.

Wood paving may be either of rectangular blocks or of round sections cut from logs. It is perhaps most useful in mild climates, as the blocks are inclined to



L.A. Alice Recknagel Ireys

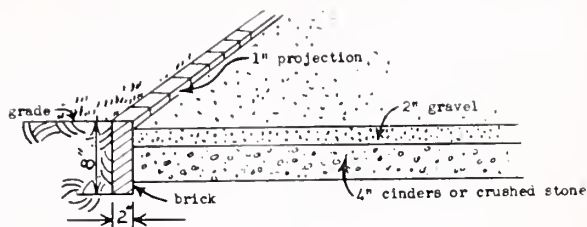
Buhle photo

The gravel surface of this informal terrace is an appropriate material for the location.

A smooth light surface of concrete is easily maintained but is likely to cause glare.

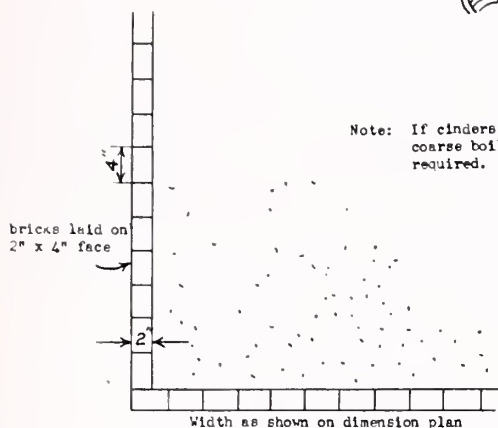
McFarland photo





Note: If cinders are used, clean coarse boiler cinders are required.

SECTION



PLAN

Detail of gravel paving.

neave out of position very badly in winter and to disintegrate in extremes of temperature. The rectangular blocks can be bought commercially in many localities and are usually creosoted for preservation. The round sections cut from logs can also be purchased in areas where there is a considerable lumbering industry or they can be cut by a local sawmill, or even by an industrious amateur. They should be of some rot-resistant wood—locust, cypress, white cedar, or redwood—and should be thoroughly treated with copper naphthenate or pentachlorophenol* solution, according to manufacturers' directions.

In mild climates or in light soil, they can be laid directly on the earth. In

heavier soil or where winter heaving is a problem, a foundation of 6 inches of broken stone and 2 inches of sand is advisable. As wood paving has a tendency to slip away from its original position, it is advisable to have a solid edge to keep it firm. The border may be of native stone set on edge, or of planks or logs treated with preservative, set deeply into the earth, and pegged in place.

For **tanbark or pine-needle paving** the area to be paved is dug out for a depth of 2 inches, the subgrade tamped or rolled smooth and uniform and covered with tanbark or pine needles.

The edge of the paving may consist of either sound hard-burned common bricks laid on their 2- x 4-inch faces, projecting $\frac{1}{2}$ inch above the finished paving; or $\frac{1}{2}$ -x 4-inch creosoted boards, pegged into place at 4-foot intervals before the tanbark or pine needles are laid, and projecting 1 inch above the finished surface.

* Obtainable under such trade names as Dowieide 7, Wood-treat, Cuprinol, and Naptex. Since these compounds may cause irritation of the skin, manufacturers' precautions should be carefully observed.



L.A. Eckbo, Royston & Williams

Baer photo

This terrace, with a combination of boards and stone laid in mortar, has dramatic contrast and is ideally suited to its surroundings.



L.A. Thomas Church

Baer photo

Wood paving blocks with a wood curb to hold them firmly in place make this a practical terrace. The interesting screen fence in the background combines well with the wood textures and coloring in the paving.



Gottseho-Schleisner photo

This curving grass path is inviting because of its width and neatly kept borders of low-growing plants.

WALKS AND PATHS

Location, construction, and planting

WALKS are, of course, essentially a means of circulation around the place. Their location, construction, and material, however, make a tremendous difference in the appearance, the comfort, and the upkeep of the grounds as a whole. Walks may be made of all sorts of materials—grass, tanbark, pine needles, wood, gravel, stone, brick, or concrete. Which kind is chosen depends largely on the use to which the walk is to be put, how much traffic it will have, its immediate surroundings—whether in woodland, in gardens, or near the house

—and to a great extent on local climatic conditions.

Kinds of Walks and Paths

Certainly the least expensive to install but probably the most expensive to maintain is the **grass path**. Under any considerable amount of use the surface of such a path is certain to be worn thin and take a great deal of reseeding, fertilizing, and constant care. It is practical, usually, only in a flower garden for secondary paths or as a panel through

the vegetable or fruit garden where there is very little traffic.

Any grass path that adjoins flower beds or other kinds of planting should have a defined edge of brick or flat stone for the lawn mower wheel to run on. Its width should be a multiple of the width of the hand or power mower on the property. In other words, if the hand mower has an 18-inch cut, the path should be 30 to 34 inches, so that two trips of the lawn mower complete the path. If there are grass paths of any considerable length on the property, careful planning of widths may make a difference of an hour or two a week and a great many feet of distance in weekly mowing.

In informal gardens or in woodland plantings, **paths of tanbark, pine needles, buckwheat hulls, or crushed pecan hulls** are all most attractive and practical. The material used depends on its local availability. Such paths are not suitable for year-round use as they are inclined to be spongy and wet under foot during the spring thaws. They should

have board, brick, or stone edges to keep the surface material from washing out into the adjoining lawns or planting sections. With their brown color they blend easily into adjoining landscape and earth colors. The surface needs renewal about every two years as it usually crumbles under use and weather.

Paths of wood blocks or rounds of wood are appropriate and desirable for informal gardens or where there is a woodland feeling. They should be treated with a wood preservative as discussed on page 93, and so treated will last for many years. They are inclined to be a little slippery in early spring and late fall, particularly if they are in heavy shade.

Gravel or crushed-stone paths with brick edges are the least expensive of the hard-surfaced paths to install and if well built, are easy to maintain. The color to be chosen depends on the effect desired and on the local stone or gravel colors. Usually gravel is more comfortable than crushed stone for the top surface. A great range of color can be

The yew hedge bordering this straight grass walk is planted far enough back that there is little danger of encroachment.

Gottsch-Schleisner photo





R. A. Smith photo

A well-constructed gravel path with a brick edge helps give pattern to this formal garden. The grass border is the width of a narrow lawn mower and gives greater dignity to the path.

had with broken bluestone, limestone, sandstone, and marble of various colors and textures. In a flower garden of intricate pattern, paths of white or yellow gravel or stone make the pattern stand out brilliantly and add to the formality of the garden. In an old-fashioned garden, dark-colored gravel, sparingly used, is reminiscent of the old dirt paths of country gardens.

Gravel paths are particularly practical in cutting gardens and vegetable gardens, and as the outside path of the flower garden. They allow the flower grower to get around his garden in the early

morning dews without too much discomfort from wet feet. They also save a great deal of mud in the house during the gardening seasons of the spring and fall, when grass paths are too muddy to walk on.

Stone, brick, and concrete are suitable for the important or much-used paths on the place. Certainly the ones to the front door and the back door should be of these materials. They are more expensive to install than grass, gravel, or wood, but take almost no upkeep except an occasional sweeping, and perhaps the use



McFarland photo

Weathered flagstones laid closely together make a practical and appropriate walk in a shady spot. Simplicity of pattern and the use of relatively few stones add to its beauty.

of weed killer now and then on the brick and flagstone. They have the added advantage of being easy to shovel in sections of the country where snow is likely to be a problem.

Stepping stones instead of solidly paved paths are suitable in some informal areas, or where inconspicuous surface is more important than really comfortable circulation. They may be of flagstone, native irregular stone, or wood rounds. Their chief disadvantages are difficulty of spacing and of upkeep. If they are properly spaced for a man, the

average woman usually steps between them. If they are spaced close together they become a narrow walk rather than stepping stones. In wild gardens the plants around them are likely to cover them completely in an astonishingly short time. When they are in the lawn, constant hand-clipping is necessary, and in the course of two or three years much of their surface is below the turf level, and they are a hazard rather than a pleasure. They should be used with great caution, and with the knowledge that their upkeep is likely to far outweigh their initial economy.



Gottschö-Schleisner photo

Irregular broken flagstones are appropriate in a woodland setting. The shade keeps the grass from growing too rampantly in the wide joints, so the path is comfortable enough for one not too often used.



L.A. Mary Deputy Cattell

R. A. Smith photo

Flat-surfaced native stone in an informal walk.

Small irregular stepping stones are a distraction to the eye in an otherwise restful scene. They require considerable hand-clipping to keep them from being submerged in the lawn.

McFarland photo





Gottschö-Schleisner photo

Herringbone brick walk in an old-fashioned herb garden.

Dimensions and Construction

The width of a paved walk or path is determined largely by the amount of use it gets and the proportions of the areas adjoining it. The main paths to the front door and around the garden and to the garden should be wide enough for two people to walk abreast. This means that they should be not less than 3 feet 6 inches wide and are better if 4 or 5 feet wide. Service paths along which wheelbarrows or carts are likely to travel should be at least 3 feet in width. Paths narrower than this are likely to be uncomfortable, and if any planting adjoins them they will soon be overgrown and impassable in heavy dews or after rains. They should be constructed only where the size of a garden makes them imperative, or for little-used paths that must be as inconspicuous as possible.

The construction of paths and walks is the same as described for paved terraces of the same materials. (See pp. 86 to 93.)

Planting Near Walks

All walks adjoining grass should have the edges (whether of brick, stone, or wood) level with the sod, so the lawn mower wheel can run along the path and do away with the need of hand-edging. Where it adjoins flower or shrub beds, the edge of the path should be at least $\frac{1}{2}$ inch above the earth of the bed. If mulches of clippings, peat moss, or buckwheat hulls are to be put over the planting, the edge of the path must be high enough to keep them from washing out into the path every time it rains or the planting is watered.

Edge plants. Planting near walks can be very troublesome. In a garden, whether a decorative or service garden, the edge plants must be kept far enough back to avoid narrowing the walk uncomfortably even at their season of lushest growth. At the same time they must be close enough to prevent a great expanse of bare soil, which would give the appearance of no edge at all. To accomplish both ends, annuals, perennials, and vegetables of tidy rather than sprawling habit

are easier to manage. Dwarf petunias, lobelia, and ageratum are better than balcony petunias, sweet-alyssum (*Lobularia maritima*), or candytuft (*Iberis*) unless there is to be a considerable amount of shearing back all through the late summer. Gentian speedwell (*Veronica gentianoides*), coral bells (*Hebe sanguinea*) and its hybrids, and candytuft SNOWFLAKE (a named variety of *Iberis sempervirens garreuxiana*) soften the edge of a garden path without encroaching on it as do the ordinary evergreen candytuft (*I. sempervirens*), Hungarian speedwell (*Veronica latifolia rupestris*), creeping speedwell (*V. repens*), and Persian nepeta (*Nepeta mussini*). With gravel or native stone paths, where weed-killer is likely to be needed on the path, it is a nuisance to have shear or lift back masses of flowers each time the path is weeded.

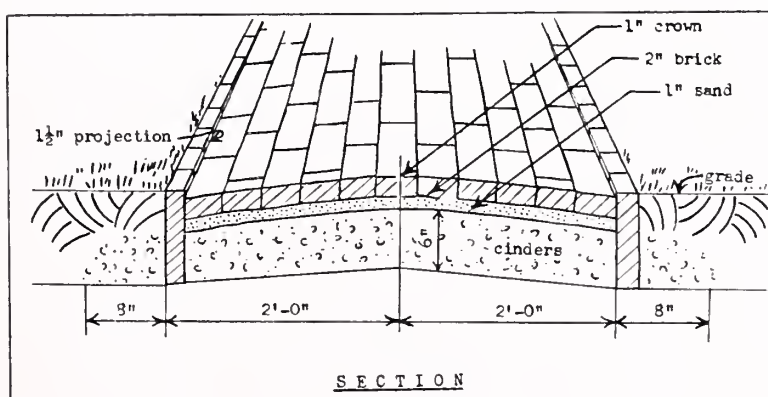
Where a **trimmed hedge** is next to a walk it is important to make sure from the start that the hedge has room to grow to its ultimate width without having either the hedge or the path moved. If the hedge is planted small this may result in a wide expanse of soil for several years; but mulch or ground cover or even a strip of grass (the width of the lawn

mower) is much less expensive than major moving later. Tall hedges such as hemlock, beech, hawthorn, and ironwood are correspondingly broad, and should be planted so that their center line is at least 3 feet, or better 4 feet, from the edge of the path. Privet (*Ligustrum*), upright yew (*Taxus cuspidata capitata*), and American arbor-vitae (*Thuja occidentalis*) can be kept in bounds with centers 2½ to 3 feet away. Only low or fairly narrow hedges such as Hatfield or Hicks yew (*Taxus media hatfieldi* or *T. media hicksi*) and Japanese hollies (*Ilex crenata* and *I. crenata convexa*) should be as close as 2 feet; and even dwarf box (*Buxus*) in tiny sizes will encroach in seven or eight years, if it is closer than one foot to the edge of the path.

Occasionally a walk is bordered by a **low ground cover** such as English ivy (*Hedera helix*) or trailing-myrtle (*Vine minor*). The front line of the ground cover should be at least 8 inches back from the paving, if constant clipping or trampling is to be avoided even by the end of the first or second season after planting.

Particular care must be taken to avoid **thorny plants** too close to walks. In the

Detail of brick walk.





R. A. Smith photo

The boxwood edge on the brick path is too close and has the effect of narrowing it. This pattern of brick is excellent in a formal setting.



Gottseho-Schleisner photo

The hard-packed earth path with very little gravel on the surface is appropriate to the old-fashioned herb garden. The curbs of weathered logs are practical and in character.

rose beds the edge row should be at least a foot from the path and farther than that if they are vigorous roses. Winter-green barberry (*Berberis julianae*) makes a beautiful evergreen hedge, and Japanese barberry (*Berberis thunbergii*,) an inexpensive deciduous one. They are most disastrous at too close quarters, however, and should be kept with centers at least 2 feet from the edge of the walk.

The same caution in spacing must be observed with **untrimmed hedges** of plants such as lilacs (*Syringa*), flowering quince (*Chaenomeles*), and Father Hugo's or rugosa roses (*Rosa hugonis* and *R. rugosa*). These must be set 3 to 4 feet from the path edge if they are not to end by being trimmed hedges on the side toward the path.

STEPS FOR GROUNDS AND GARDEN

What kinds to use and how to build them

STEPS are obviously a means of getting from one level to another. They may be set in a wall or in a bank. The material, design, and construction should be appropriate to the architecture or the landscape around them. Steps should be made of material that is easy to get and to build in the immediate locality, and the construction should be safe, durable, and easy to maintain.

Kinds of Steps

Steps may be of brick, stone, concrete, wood, grass, or a combination of two or three of these. Outdoor steps, as a general rule, should be much shallower in riser height and broader in tread than any indoor steps. Where there is a slight drop in grade, or in a gently sloping bank, a riser height of 4 inches with a tread of 18 inches is ideal. A 5-inch riser should have a 16-inch tread, a 6-inch riser a 15-inch, and a 7-inch riser a 13-inch tread. The 7-inch riser should be used only where there is a considerable amount of height to be gained and not much horizontal space in which to do it. Usually, it is advisable not to have more than 6 inches in riser height.

Steps built in a bank should be so planned that they are one riser height out of the slope throughout the entire length. This will prevent the soil of the bank from washing out all over the steps with every rain. It requires a little extra finishing on the end of each tread but is sound practice.

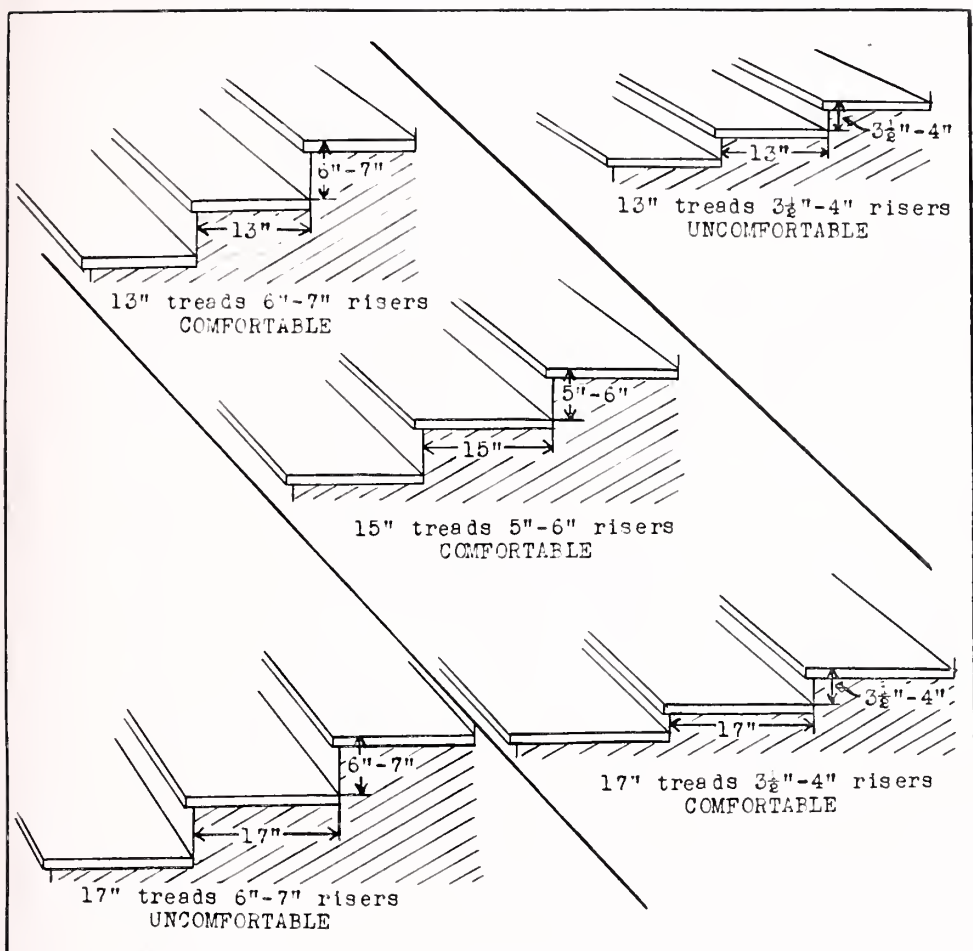
The **steps in a retaining wall** may be built back of the front surface of the wall receding toward the higher grade, or may start at the edge of the retaining wall at the top and extend over the lower

grade. The latter, if there are more than three steps, will require an additional wall at the side for safety, called a wing wall. This usually makes a more formal-looking flight of steps; and if there are several flights that can be seen from a lower level, it gives a rather monumental appearance. If the steps are let back into the upper grade, it is usually more attractive to extend the lowest riser beyond the face of the wall and make it a little wider than the upper steps. This is particularly important where there are five or six steps. If there are more than that, the first two risers should extend in front of the wall.

The type of steps to choose depends largely on the surroundings. If the retaining wall is of brick, flagstone treads with brick risers will probably look best. If it is a stone masonry or carefully laid dry wall, the steps may have flagstone treads and stone risers. For a cruder type of dry wall, large native stones laid in dry will be most effective. With such a wall, grass steps or log or plank steps may look perfectly in keeping and of course are usually less expensive to build. In informal areas like water gardens, wild gardens, rock gardens, or woodlands, steps of logs or large native stones look much more at home than any built of the more formal materials. In open lawns, where the slope is very gradual, grass steps with board edges are least noticeable and make the transition down a grade almost imperceptible.

Construction

Masonry steps are built on concrete or rubble foundations. The excavation is made in steps or on a slant, as indicated



Proportions of risers to treads.

in the drawing. The foundation for the bottom step should be 18 to 24 inches deep. The riser, or front, of the step may be of stone or brick. The tread, or top, of the step is better made of flat flagstone or slate, projecting 1 inch in front of the riser. Brick treads are acceptable but likely to wear in the mortar joints and allow frost to penetrate.

Grass steps and ramps must be carefully constructed for safety and for easy maintenance. The front, or riser, of a turf step should be no more than 4 inches

high and may be of wood planks, treated with preservative, thin slabs of flat stone with flat top edges and fronts, granite blocks, or brick.

Wood risers should be pegged into the step at each end and be set in the ground at least 4 inches. Stone risers should be set in concrete 12 inches deep unless the stone itself is wide enough to extend at least 9 inches below the grade of the step. Brick risers should be set in 12 inches of concrete for safety. Otherwise constant use will loosen them and make them very dangerous.



L.A. Florence B. Baker

R. A. Smith photos

Flagstone treads and stone risers tie in perfectly with the dry wall. The pair of dogwoods at the top of the steps adds greatly to the invitation and graciousness of the steps.

The brick risers of these steps are appropriate to the brick wall adjoining. The flagstone treads give contrast of color and greater permanence than brick treads.





Avery photo

Both material and proportion of these steps are unpleasant. The lack of contrast between gray concrete and gray flagstone is uninteresting. The riser height is too great to be at all comfortable.

The treads of grass steps should be at least 24 inches deep to allow the lawn mower to run on them. The same type of construction is used for ramp steps. Their depth (distance between risers) depends of course on the slope, but for comfort the ramp pitch should not be greater than 1 inch for each foot of depth.

Grass on either steps or ramps must be of fine quality. The topsoil should be at least 8 inches deep, well fertilized and sown with a wear-resistant grass mixture, or sodded with clean, strong turf. The mixture differs with climate and local conditions; local seed stores or greens keepers will usually advise which formula is best.

R. A. Smith photo



These broad steps are deceptively inviting; actually the treads are too deep for one step and not deep enough for two. It would be better to have two flights of narrower steps separated by a landing.

This broad flight of steps has the comfortable proportions of 6-inch risers and 15-inch treads.



Avery photo

Log steps are best built with a 6-inch riser formed of split logs with the split face exposed. These logs should be 8 inches in diameter, sunk into the earth 2 inches, and the ends pegged firmly into place with wooden stakes about 18 inches long, driven down to finish flush with the top of the step. The wood should be treated before setting with a pentaachlorophenol or copper naphthenate preservative, (see footnote, p. 93) applied according to manufacturers' directions. The treads may be formed of (1) good topsoil,

tamped firmly so there will be no settling, and then sodded with first-class sod free from weeds, or (2) brick or flagstone laid on sand and cinders as described under paving. Old railroad ties are excellent for this type of step.

Board steps are built of heavy planks not less than 2 inches thick, treated with a preservative, and supported on either end by wooden stringers as for indoor steps, or let into the adjoining bank and pegged in place at either end.

L.A. Alice Recknagel Ireys

Buhle photo



An entrance porch of old brick laid in cement is appropriate to a small traditional house.



R. A. Smith's photo

A very wide flight of steps makes the transition between two lawn levels easy and inconspicuous. The steps have grass treads with risers of weathered boards.

Planting Near Steps

Planting near a formal flight of steps can do a great deal to soften its lines or to give it more apparent width. Steps in a bank usually need planting at the edges to soften the transition from stone or wood to earth. The planting must be carefully chosen and put far enough back from the edges of the steps so that it will not, in the course of two or three years, almost close up the opening.

This is a perfect location for low-growing ground-cover shrubs like some of the dwarf cotoneasters or spreading yews (*Taxus*) and junipers (*Juniperus*). If ground-cover plants are used too near the steps, great care must be taken to keep them off the treads. They make very unsafe footing and are likely to trip the passer-by.

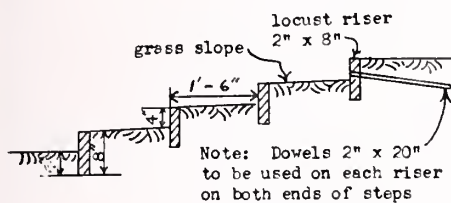
Where two or three steps project in front of a retaining wall, a low substantial bush on either side can take the place of a wing wall. The wing wall is not actually necessary for safety, but steps projecting in mid-air have an insecure look.

Plants suitable for such purpose are low dwarf boxwood (*Buxus sempervirens*

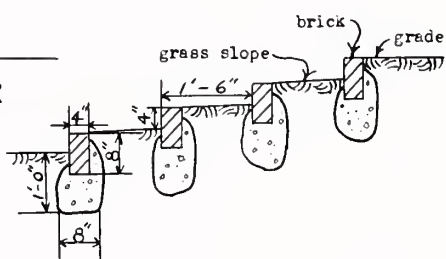
suffruticosa), dwarf holly (*Ilex crenata convexa*), evergreen barberry (*Berberis-julianae*), dwarf flowering quince (*Chaenomeles*), dwarf winged euonymus (*Euonymus alata compacta*), and Japanese pieris (*Pieris japonica*), often wrongly called andromeda. All of these have a rather regular and compact form.

When the flight of steps projects entirely into the lower level and wing walls are required, a spreading and picturesque shrub or small flowering tree on either side of the wing walls will make them seem less intrusive. Sometimes vines over a series of wing walls will soften them enough to make them almost unnoticeable.

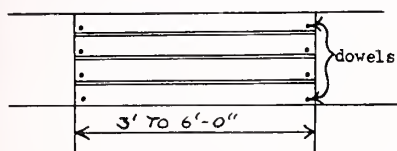
If the flight of steps from one level to the other is necessarily of eight or ten risers and, therefore, rather imposing, a pair of flowering trees at the bottom of the steps will do much to dwarf their height and make them seem less formidable. On the other hand, if the flight of steps is low in comparison with a tall house or a very tall wall or hedge behind them, a similar pair of trees on the top of the wall or bank will increase their apparent height.



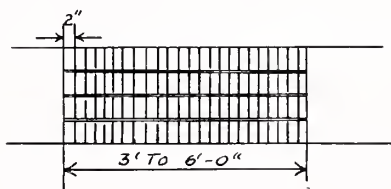
CROSS SECTION OF RAMP STEPS "A"
LOCUST RISERS, GRASS TREADS



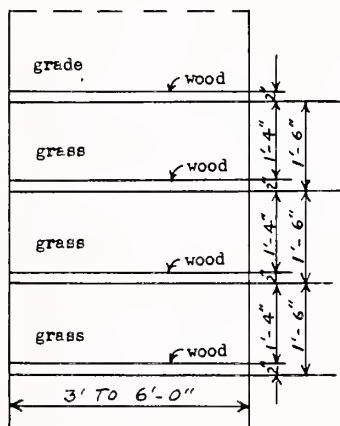
CROSS SECTION OF RAMP STEPS "B"
BRICK RISERS, GRASS TREADS



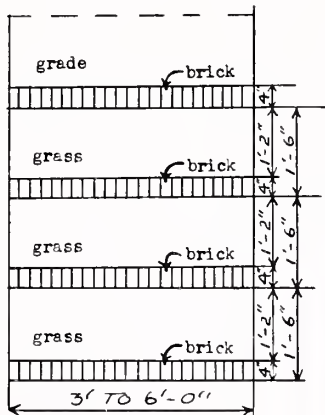
ELEVATION - STEPS "A"



ELEVATION - STEPS "B"



PLAN - STEPS "A"



PLAN - STEPS "B"

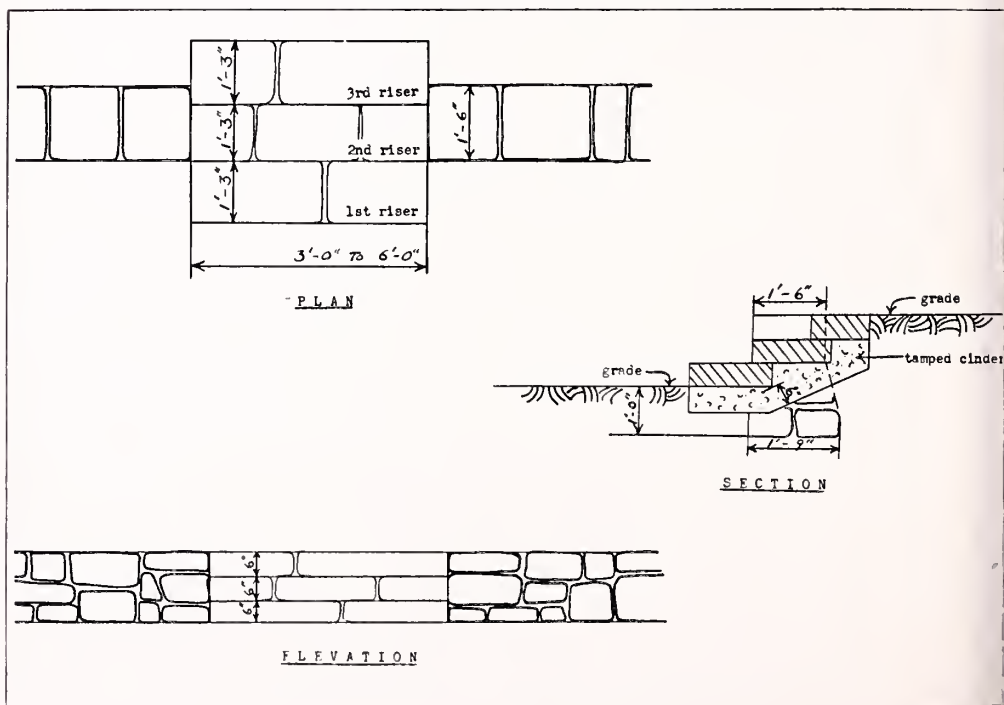
Details of ramp steps with wooden and with brick risers.



R. A. Smith photo

Large native stones, cut square and laid without mortar, make fine steps in sections of the country where such stone is available. Large stones look substantial and stay safe and solid in severe climates.

Detail of native stone steps.



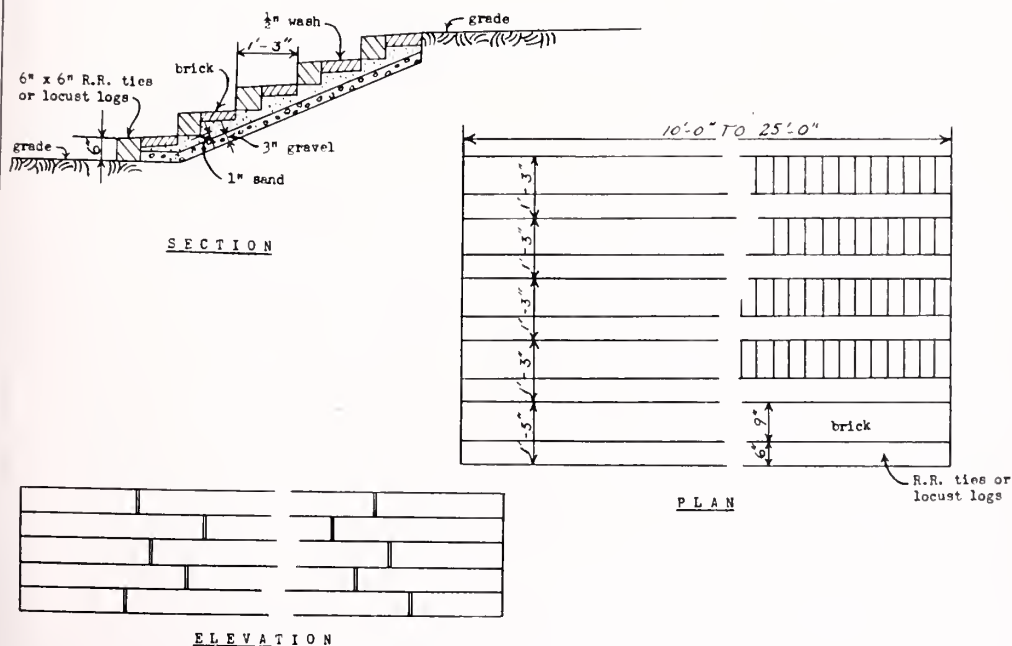


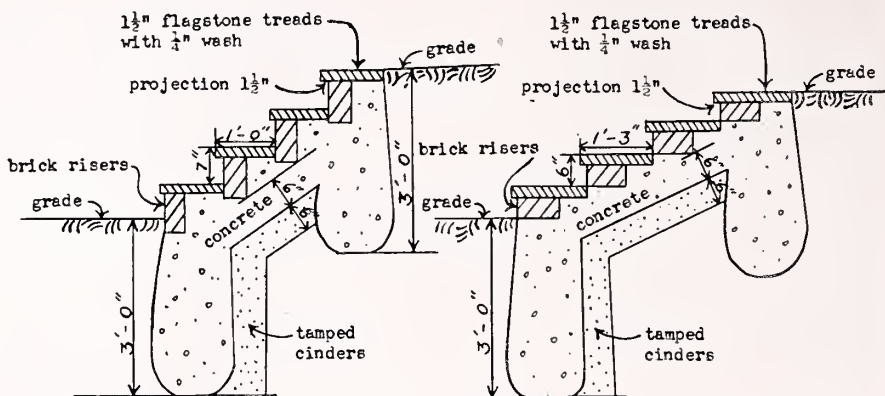
L.A. Florence B. Baker

R. A. Smith photo

In informal surroundings, these steps of grass and locust logs are appropriate and easy to build.

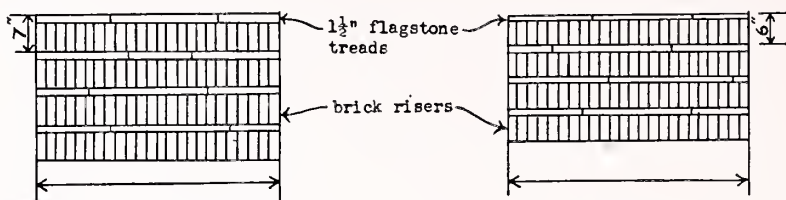
Detail of log and brick steps.





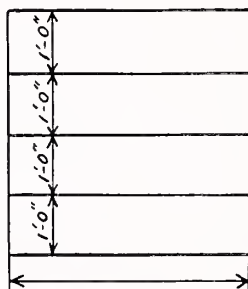
TYPICAL SECTION
OF STEPS "A"

TYPICAL SECTION
OF STEPS "B"

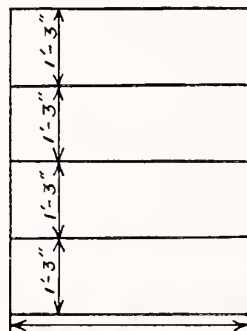


ELEVATION
STEPS "A"

ELEVATION
STEPS "B"



PLAN - STEPS "A"



PLAN - STEPS "B"

Details of brick and flagstone steps.



Gottseho-Schleisner photo

A low retaining wall of native stone laid without mortar shows sound construction and good choice of stones for proportion and feeling of permanence.

WALLS OF MANY KINDS

For many purposes and situations

WALLS are frequently a necessity, sometimes a luxury, and often an alternative to fences or screen planting. Whichever they are, their success depends on choosing the type of wall best suited to its surroundings as far as looks go, and also to the local conditions of both material and labor. For example, in sections of the country where there is little or no local stone except round cobblestones, it is unwise to try to build a good dry-laid stone wall or even an attractive masonry wall. It is far better to settle for concrete, concrete blocks, or brick than to import expensive materials where even the best of local

masons is not used to laying stone and will probably do a second-rate job. Where stone is plentiful, a stone wall is probably the least expensive of all; and building one, particularly without mortar, is an art even the veriest amateur can learn with a little patience.

Retaining Walls

The wall that is most likely to be a necessity is the retaining wall. It is, as the name implies, a way of holding up earth from a lower to a higher level. It takes the place of a bank or slope; and while it is more expensive to build than a plain bank, it has the great



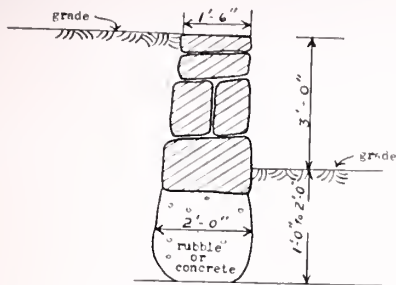
Gottsch-Schleisner photo

A dry wall with earth pockets gives excellent opportunity for planting in the wall. The transition from the flower bed below to the one above is enhanced by the wall planting.

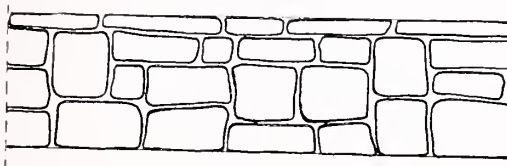
A tall retaining wall with planting pockets takes skill and practice to build. Unless local workmen are accustomed to doing such work, this type of wall is almost impossible to achieve.

McFarland photo

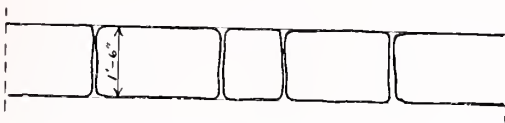




CROSS SECTION



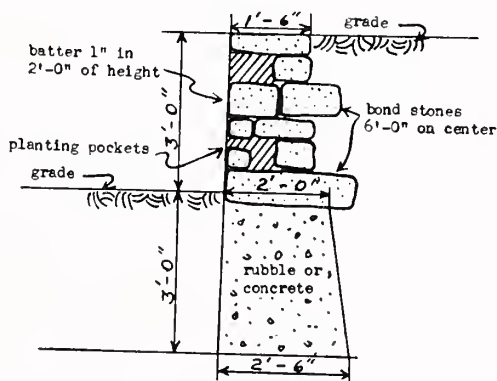
ELEVATION



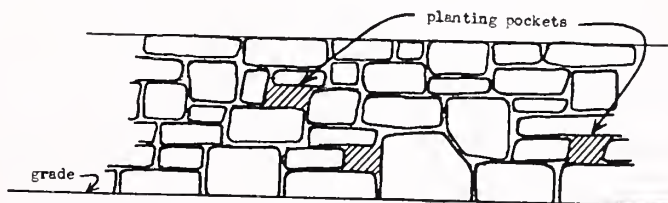
PLAN

Detail of dry stone retaining wall.

Detail of dry stone retaining wall with planting pockets.



SECTION



ELEVATION



R. A. Smith photo

This masonry wall gains additional height by the peach trees which are espaliered at the base and pleached at the top of the wall.

advantages of requiring little or no maintenance and of giving considerably more room than the bank itself does. A narrow level in front of a house can gain a considerable amount of width if a low retaining wall is built at the bottom of a slope, and fill put in behind the wall. A wall takes about a foot or 18 inches for 3 feet of height while a bank takes 6 to 9 feet for the same height.

The wall may be of brick, stone, or concrete; a stone wall may be either a masonry wall (*i. e.*, laid with mortar or in cement) or a dry wall (local stone laid without any mortar in the joints). Our ancestors were capable of laying dry stone walls to considerable heights. Present-day masons and most amateurs should probably not attempt a dry wall much over 3 feet in height. Masonry

walls of brick, stone, or concrete can go to considerable heights and if soundly constructed will cause no trouble by cracking or breaking or bulging. Any retaining wall of great height, however, had better be left to the professional mason, as it takes a crew of men to wheel mortar, pour cement, or to build either stone or brick with scaffolding to the top.

Usually, the simpler a retaining wall is in design and the more directly it shows its construction, the better-looking and safer it is. If the wall is of local stone laid without mortar, the fewer the small stones that can be in it, the more substantial it looks. Also, the gradation from large stones at the bottom to thinner stones at the top gives it a feeling of firm foundation and safety. Even for a masonry stone wall, these same principles of stone selection apply. In a brick retaining wall, the common bond (ordinary) pattern of laying the brick is less distracting to the eye and usually more attractive than more elaborate patterns.

Free-standing Walls

Free-standing walls may be desirable either for decoration near a garden, for privacy, or for windbreak. Around a living terrace, a wall 15 to 18 inches high furnishes a great deal of additional sitting space and gives definition to the terrace itself. Such a wall is usually best built of smooth-surfaced stone or of brick or concrete, rather than of rough stone, and should have a flat cap of brick or flagstone projecting at least 1½ inches from the face of the wall. Low boundary walls around the garden or on a property line do a great deal to add to the dignity and year-round attractiveness of a place. They require much less maintenance than painted fences or shrubby hedges or borders of any kind.

Where taller walls are used for privacy, there is some likelihood of gaining privacy at the expense of cutting off all air circulation. In such a case, a brick wall, with openwork brick at the

top or even throughout the height of the wall, will still give privacy but allow the air to come through. Most interesting and colorful patterns can be worked out by leaving out bricks to form openwork patterns. Such a wall is particularly appropriate as a boundary to a garden or near the street where a tall solid wall might look inhospitable and forbidding.

Plantings for Walls

It is usually desirable to have some planting on or near a wall to prevent its looking too bare and cold. If vines are to grow on the wall, provision for them must be made at the time of building. There are a few vines that cling to brick, stone, or concrete with their own holdfasts. The only preparation necessary for these is to be sure that the wall foundations do not project too far in front of or behind the wall, so that the vines can be planted close to the wall. Careless masons frequently make their footings 6 or 8 inches wider than the wall right at the grade and it is impossible to get any vine anywhere near the wall. For other types of vines that are desirable on the wall, wood plugs inserted at the time of building will permit fastening wires or trellises to the wall at a later date. If the plugs have not been put in during building, it will be necessary to insert them with a drill or to put in expansion bolt plugs for espaliers or vines.

The vines suitable for all types of walls are discussed in the Spring 1954 issue of *PLANTS & GARDENS*, and the lists there are complete.

Usually it is better to use a considerable amount of restraint in placing vines against the wall, unless the wall is actually so badly built that the aim is to cover it up as quickly as possible. A slight tracery of vine against a sound brick, stone, or concrete wall is far more interesting than a solid mass of foliage. If the objective is a solid green line, the expense of building a wall might as well have been omitted in the first place and either a tall hedge or a wire fence covered

with the vines put in instead.

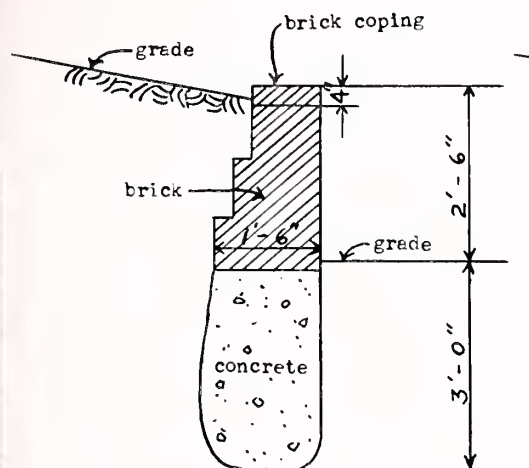
Against the wall with a very plain surface, notably of brick or concrete, a shrub or tree that throws interesting shadow patterns will be more effective than planting on the wall itself. The best choice for this purpose is a woody plant of rather open and gnarled habit, so that it has few branches and a very clean-cut silhouette. Burning bush (*Euonymus atropurpurea*), laburnum, viburnum, and magnolia are good examples of plants casting bold shadow patterns.

A wall treatment seen frequently abroad but rarely in this country is the **pleached trees** above a free-standing wall to give greater height for privacy or for shade than would be possible with a wall alone. For example, where a neighboring house stares down on a garden, a wall tall enough really to screen it would be prison-like. Instead, a 6-foot wall with trees like hawthorns (*Crataegus*), lindens (*Tilia*), or ironwood (*Carpinus*) planted close to it can provide the desired screen and give the effect of a tall green hedge on top of a wall, without taking much room in the garden.

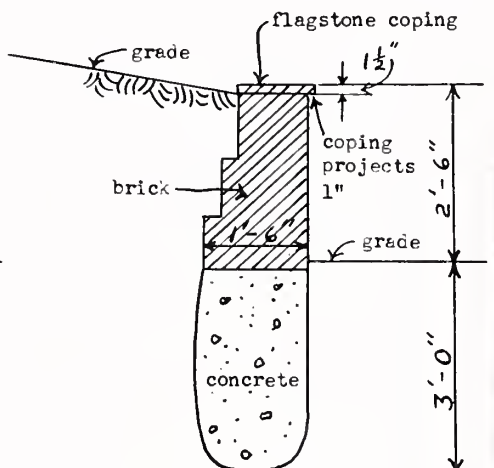
Similarly, where privacy is needed and a tall wall is not indicated, a light fence on top of a wall will allow a screen of vines to grow without cutting off all air circulation. Frequently this will still be within the zoning laws of suburban communities that do not allow walls taller than 4 feet on any property line. Even wood posts set into the wall at the time of building it, with chains between, will allow heavy vines like wisteria or bittersweet (*Celastrus*) to give quick and comfortable screens without too forbidding an amount of masonry.

Construction

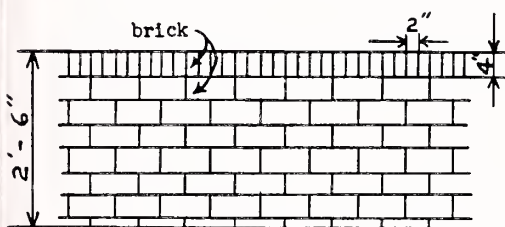
Dry stone retaining walls are built of native stone in all sizes from small pieces used to fill in the cracks to field stone as big as can be handled conveniently. The stones must be laid at right angles to the line of batter (slope) so that there is a slight tilt to the back of the wall. They are laid level



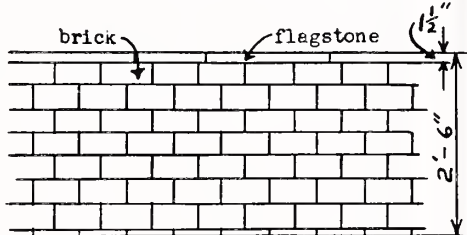
Typical section through wall
with brick coping



Typical section through wall
with flagstone coping



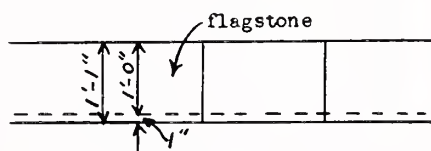
Elevation of wall
with brick coping



Elevation of wall
with flagstone coping



Plan of wall
with brick coping



Plan of wall
with flagstone coping

Details of brick retaining walls.



R. A. Smith photo

A low brick wall, laid in common bond with an overhanging brick cap, divides the garden from the lawn and gives excellent back-ground for flowers.

Pierced brickwork, made by omitting sections of brick, gives texture and fine play of light and shadow; a plain wall of this height would be forbidding.

Buhle photo





McFarland photo

A brick wall with a formal limestone coping has dignity and is enhanced by the restraint of a single clematis vine.

A serpentine wall of brick need be only 4 inches thick. The economy on the number of bricks may be outweighed, however, by the difficulty of finding a mason who knows how to lay such a wall.

Gottseho-Schleisner photo





Buhle photo

An old herringbone wall in Cornwall, England, shows unusual use of thin, local stones laid in diagonal courses.



An old, exceptionally fine example of the art of stone-fitting so that no mortar is needed.

*Photos courtesy
Mrs. Robert P. Anderson*

Close-up of section of above wall. This type of work is possible only where the local stone cuts cleanly and local masons know the art of building of such a wall.



right and left, and so that flat rather than rounded faces show. The wall need extend only 1 to 2 feet below grade, and the foundations may be rubble, or concrete, or large stones laid dry, whichever is cheaper. The width of the wall at the bottom of the footings must in no case be less than one-third of the total height of the wall, and the width of the top of the wall is usually 18 inches. The front face should have a batter or slope of 1 inch in 2 feet of height. The back of the wall should slope so that at no point in the wall is the thickness less than two-fifths of the vertical distance from the top of the wall to that point. Bond stones at least 2 feet 6 inches in length should run back into the bank approximately every 9 feet; they keep the wall from tipping and are most important.

The coping or top course of the wall should be at least the full width of the wall (18 inches). If some stones are wider than others and project into the grade behind, the irregularity adds to the charm of this type of wall.

Dry stone retaining wall with flower pockets. This wall is built the same as any dry stone retaining wall, with the following modifications. Earth is packed between the ends of the stones, as if it were mortar, and a bed of earth is laid on top of each course (horizontal layer of stones). From the start of the wall the soil must be rammed in behind and between all the stones. The success of the wall depends upon tight ramming and too much importance cannot be placed upon it. In approximately every 9 square feet a pocket should be made of topsoil and sand in equal parts, tightly rammed, just back of the exposed face of the wall, to allow for planting.

The wall should extend at least one foot below finished grade and the stones below grade are firmly laid without soil on a hard earth bed.

Stone retaining walls laid in mortar. Masonry walls of native stone may be laid as shown, in good cement mortar. Foundations of rubble or concrete must extend to frost level, which varies in

different climates. The stones must be laid level right and left, at right angles to the line of batter (slope), and so that flat rather than rounded faces show. The joints on the face must be as tight as possible and raked or scratched so that the face of the wall looks like a dry wall. Great care should be taken that the mortar is cleaned from the face of the stone.

Weep-holes of 4-inch iron pipe or tile extending through the wall, 6 feet apart, allow for drainage and are essential to keep the wall from cracking.

The coping at the top of the wall may be made of native stones from 2 to 4 feet long, laid with flush joints, showing as little mortar as possible; or flagstone 1½ inches thick may be used, in good mortar with flush joints, and projecting 1½ inches from the face of the wall.

Brick walls. Strip topsoil from the area to be excavated and pile in a convenient place for later use. Excavate for walls and footings to solid earth below frost line in the locality.

Foundations for brick walls may be built of common brick or concrete, whichever is cheaper. They extend to the frost line.

If the foundations are of concrete the proportion of cement, sand, and crushed stone or gravel should be 1:3:5.

From 2 inches below finished grade, bricks are laid in first-class cement mortar. The easiest pattern to lay is known as common bond with a course (layer) of headers every fifth course. Mortar is composed of one part cement and three parts sand.

The coping or top layer may be of brick with joints on the top struck flush, or of rectangular flagstone 2 inches thick projecting 1½ inches from the face of the wall.

Brick retaining walls are built in the same manner but increased in thickness so that the width at any point is at least one-third of the distance from the top of the wall at that point. They must have weep-holes of iron pipe or of omitted bricks every 6 feet, close to the lower grade for drainage.



Gottseho-Schleisner photo

A small city garden gains privacy with a brick wall. The pierced top of the wall admits air and gives a feeling of delicacy that a solid brick wall would lack.

A tall and imposing wall of concrete with a stucco finish is excellent background for the dramatic planting of carefully trained wisteria.

L.A. Florence B. Baker

R. A. Smith photo





Roche photo

The plain random-width board fence screens the service yard and contrasts with the more elaborate design of the picket fence around the flower garden.

FENCES

For function and beauty

FENCES have almost infinite possibilities and variations in design, material, and usefulness. They serve almost the same purposes as free-standing walls or hedges and are usually about halfway between the two in price.

The reason for building the fence is a primary factor in determining the type of material and general design. It may be wanted essentially for a screen, seclusion, or windbreak. In that case, it is usually high and tight. At the other extreme is the fence primarily designed

to serve as a boundary or as a support for some kind of vine. This type is usually of low or medium height and of open character. Other fences may be used as decorative adjuncts to a garden or to separate the cultivated part of the place from the wild or from the service areas.

The architecture of the house is also important in deciding on the architecture of the fence, and the immediate surroundings of the place itself and its neighbors should play some part in the decision.



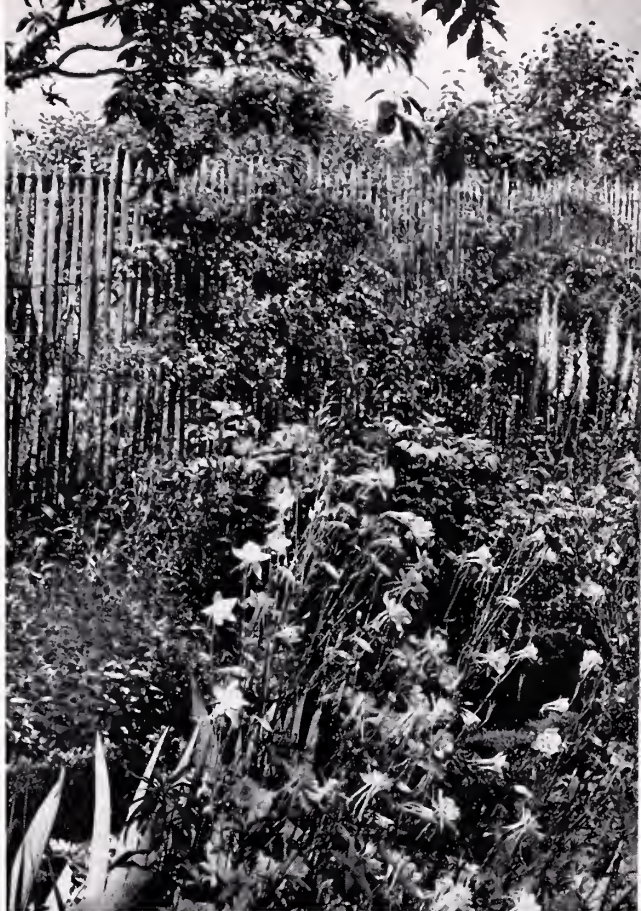
ROCKE PHOTOS

Post-and-rail fence is readily erected and a good boundary in rather open country.



A closely-woven stock sapling fence makes a tight screen behind a small pool. In such a woodland setting, this weathered fence is unobtrusive and valuable.

The open woven-sapling fence has good play of light and shadow as a background for flowers, and provides a windbreak without cutting off all air movement.



Gottso-Schleisner photo

English hurdle fencing has the twin advantages of lightness of proportion and ease of erection. Since it was originally designed for temporary fence around pastures, it is an excellent choice where a hedge or a wall is contemplated at a later date.

R. A. Smith photo





Buhle photo

Twining vines such as wisteria can tear apart even the most substantial of wood structures in a few years' time.

Kinds of Fences

The materials of the fence may vary from crudely split rails or saplings to the most sophisticated modern plastic or plywood sheet, with infinite variations between them.

Boundary-line fences of post and rail or of hurdle-fencing come ready-made and are relatively easy for the owner to erect with a little common-labor help. Since they originated in the country, where wood was plentiful and available, they usually look better in the same sort of setting. They seem appropriate to the farm or the place in open country or around the property of 3 to 4 acres in extent.

In the smaller suburban property the

board version of the post and rail is usually more at home. It may consist of two or three horizontal boards nailed between posts; and its decorative value depends greatly on finials used on top of the posts and on the proportions of the boards. If it consists of three horizontal boards, graduating them—using 1-x 4-inch board for the top, 1 x 5 for the second, and 1 x 6 for the bottom—results in a more interesting design. A very attractive variation, common to many parts of the country, is that of a horizontal board at top and bottom with cross boards between. This is a very simple, easy fence to erect and a little more decorative than the plain horizontal boards. Board fences of any sort may be left unpainted and allowed to weather to a soft gray, or painted a color appropriate to the surroundings. If vines are to be grown on them, it is usually much wiser to leave them unpainted, as removing tangled vines for the painting every three or four years gets to be a major maintenance problem.

Where the fence must keep out intruding animal life or small children combination of wire and board may be necessary. The fence may consist of either iron or wood posts with heavy link wire stretched between them, or may have heavy wire tacked on the back of a board fence and extending down into the ground. Woodchucks, rabbits, dogs, and cats have a way of burrowing under a fence, even if it is only an inch or two from the ground. Small children find fences irresistible to climb if the boards are spaced so that they can get a good foothold.

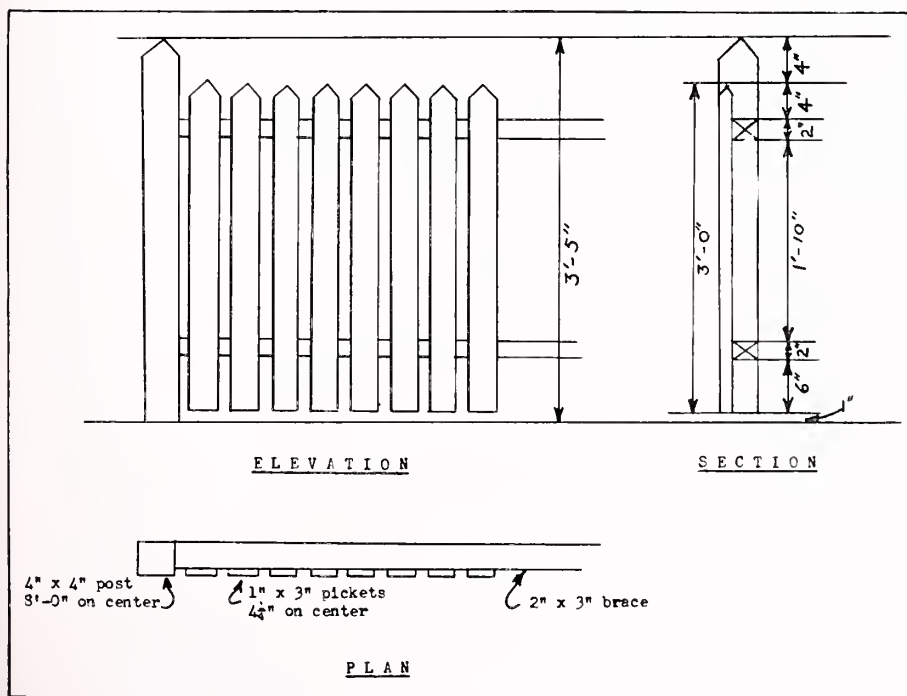
Fences for screening either part of one's own property or the neighbor's must obviously be tall and tight. The crudest form is the sapling fence, which comes ready to erect and in the right setting is very attractive. It does cut out air, usually; and for the most part it looks better in rather wooded land, where tree branches overhang the top and its more or less rustic character blends with the surroundings. It is



Gottseho-Schleisner photo

A low picket fence of stock pickets gives enclosure from the street and traditional background to a dooryard garden.

Detail of low picket fence.



probably the easiest of all fences to erect. It can be made more architectural in feeling by the addition of boards at the top and bottom or by being set in a panel made of squared wood posts with 2- x 4-inch rails at top and bottom.

Other screen fences may vary from horizontal or vertical wide boards of random widths to sheets of outside plywood or asbestos board, plastic, or combinations of these. The material chosen depends largely on the setting and the cost of the material in the local market. Obviously, the more modern materials do not belong near a traditional house; and the tall, colonial board fence with traditional design would look strange near a contemporary house.

If the object to be screened is very tall, a combination of a solid fence at the bottom and latticework or open mesh of some kind at the top will keep it from looking too forbidding and will let more air through. Where the wind is very strong it is advisable to leave some spacing between the boards or other materials of the fence. Otherwise, there is too much wind resistance and posts are very likely to be loosened in the ground. With a board fence, for example, $\frac{3}{4}$ -inch spacing between the boards will let air through but still give privacy. A louvered fence is the perfect answer to the screen for privacy without cutting out air.

Picket fences are a subject all by themselves. They vary in type, in design, and in use. They are frequently combined with other fences or with walls.

Perhaps the simplest and one of the most attractive is the traditional fence of reasonably narrow flat pickets with pointed tops and the space between the pickets half that of the width of the pickets. In other words, if the picket is 3 inches wide, the space between is $1\frac{1}{2}$ inches. This type of fence is easy to erect and is of stock lumber sizes. Many lumber yards, indeed, carry the pickets already pointed and ready to erect, or even panels of such picket fencing.

Other variations range from very broad board pickets up to 6 inches wide, with tight spacing, to more elaborate and formal round or turned pickets, usually associated with the larger house and more elaborate grounds. This latter type of fence usually is a purely decorative one, marking the boundary or the entrance to the place, and has beautifully turned finials on the fence posts; it is often placed between stone or brick piers.

The lower and more informal flat picket is often useful on top of a low wall or in combination with a horizontal or vertical board fence, for privacy at the bottom of the fence with light and air at the top.

Planting on Fences

Planting on or near fences should be considered carefully. **If the fence is to be painted**, some method of removing any vines grown on the fence must be devised; otherwise there will be an almost endless task every three or four years when it is time to paint the fence. It is probably wiser in that case to use vines that really need severe cutting every two or three years, such as virgin's bower (*Clematis virginiana*) or honeysuckle (*Lonicera*) or akebia (*Akebia quinata*). They make rapid recovery from being cut almost to the ground and actually look better than if allowed to be a tangled mass for years.

With fences to be left unpainted, rampant-growing vines are perfectly possible. They are likely, however, to hide the fence completely if left to their own devices and to consist mostly of heavy unbearing wood.

If the fence is well designed and attractive in itself, very little planting near it is needed.

A purely utilitarian **wire fence** is the only one that should be completely covered with vines, as the support of vines is its chief purpose. Fences of open lattice work or thin members of any kind should never have twisting vines like bittersweet (*Celastrus*) or wisteria put on them. In almost no time at all

they will be ripped to pieces by the strength of such vigorous growers.

The Spring 1954 issue of *PLANTS & GARDENS* has complete lists of vines for many purposes, and the choice for fences can be made from those lists.

Construction of Fences

The wood used for both the fence itself and its posts depends greatly on whether it is to be left to weather or to be painted. In any case, all parts of the wood that touch the ground or at least the parts of the posts that extend below grade should be thoroughly treated with wood preservative before erection. They can be soaked for several days in a solution of either copper naphthenate or pentachlorophenol (see footnote p. 93) and allowed to dry before setting. Another treatment is to give the posts below grade several coats of creosote followed by a coat of tar. If there are a great many posts, either of these treatments entails a great deal of work.

A method of more recent origin, equally satisfactory for the home builder, is to saturate the back fill around the posts after they are in place with a mixture of equal parts of raw creosote and fuel oil No. 3. This should be poured in through the back fill to 4 inches below grade. If planting is to be done near the posts, there should be an aluminum collar over the oil. This can be of heavy aluminum foil but sheet metal is better. From 4 inches below grade to 4 inches above grade, the posts should be painted with 8% copper naphthenate

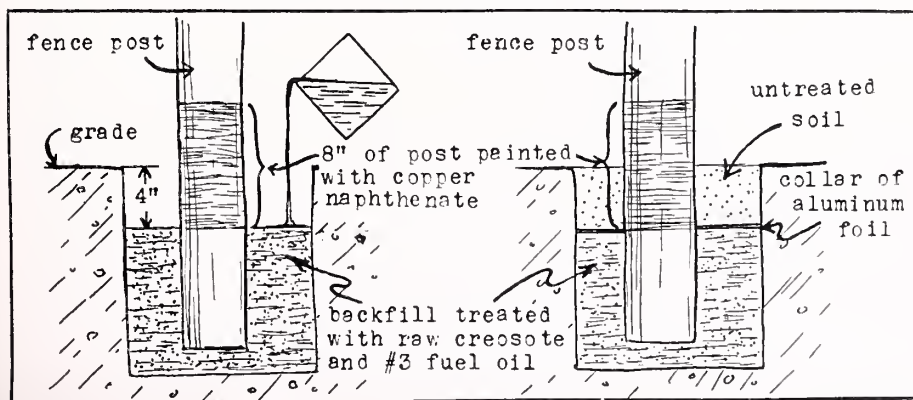
solution. This treatment prevents all forms of rot and is relatively easy to apply.

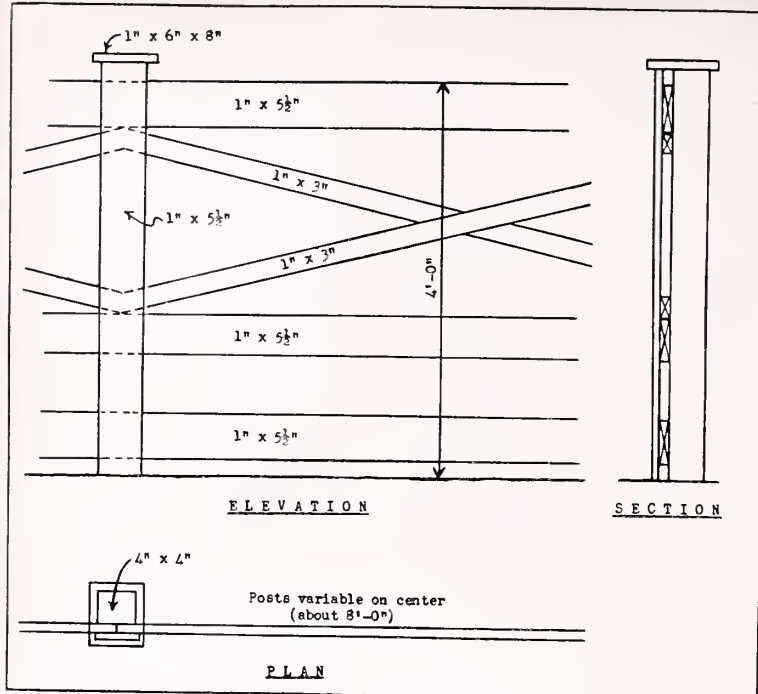
Locust is probably the most durable wood for posts and will actually last for many years with no treatment below grade. It is, however, hard to obtain in many localities; and it is rather rough, usually, so is not too well suited for formal fences. Other satisfactory woods are white cedar, cypress, and redwood, but all of these need protection in the earth.

If the fence is to be left to weather, white cedar, redwood, chestnut, and cypress are satisfactory and turn a very pleasant grayish color in a year or two. It is advisable, even with these woods, to give a coat of preservative, particularly where they adjoin a post or other pieces of wood.

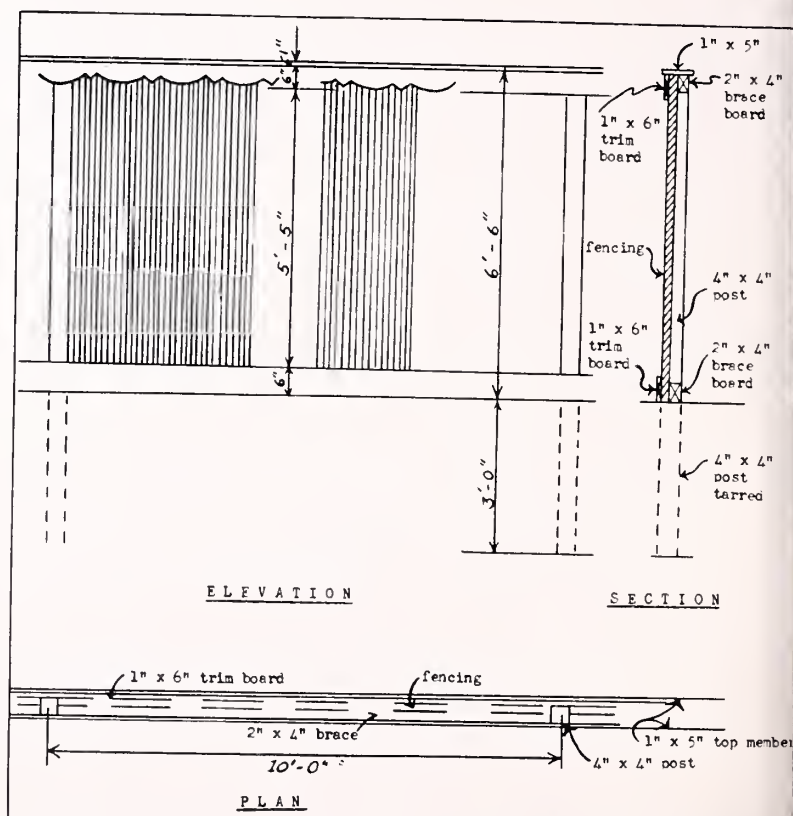
If the fence is to be painted, it may be of almost any wood locally available. Where any two pieces of wood adjoin they should be painted before erection; for example, where the board fence is nailed to the post, the back of the rail and the front of the post should be painted before nailing. Galvanized nails or screws should always be used for erecting fences outdoors so that there will be no trouble with rust on the fence later. Some of the special new materials require special kinds of fastening; but the supplier, whether the manufacturer or the local lumber yard, is usually equipped to give advice and furnish the necessary fasteners for outdoor use.

A method of preserving wood posts.





Detail of board fence.



Detail of woven wooden fence with trim board on one side.



Roche photo

An inexpensive board fence.



The problem of the always-open gate is solved in Colonial Williamsburg by a chain and heavy iron ball which automatically closes the gates in these two well-designed fences.

Avery photos

This simple device is easy to construct and install, and is practically trouble-free.

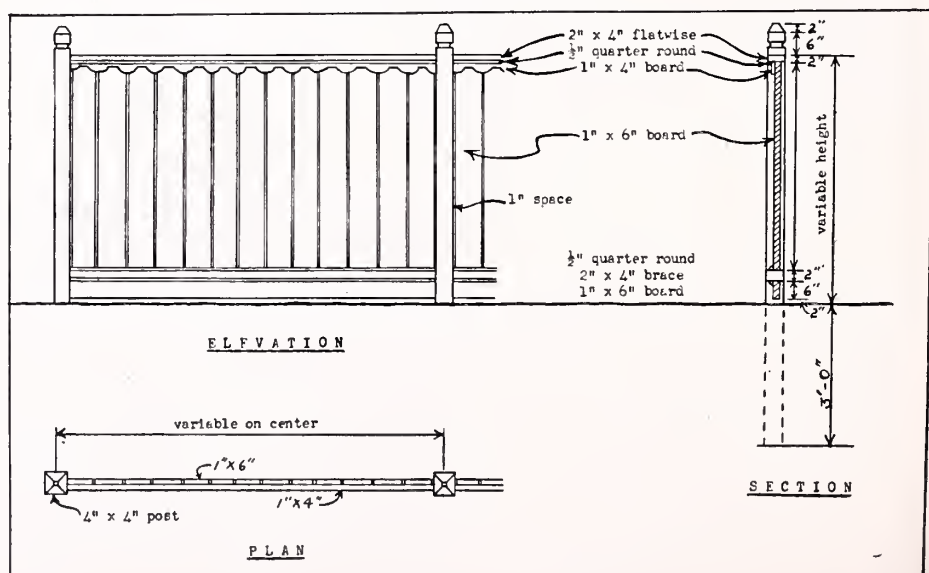




Gottsch-Schleisner photo

This garden boundary fence is a cross between the vertical board and the picket fence. It can be economically built of stock lumber by unskilled labor.

Detail of board fence.





McFarland photo

The circular pool is deep enough for planting water lilies and enlarges the spring garden by reflecting the flowers.

GARDEN POOLS

*Versatile and charming,
they can be used in many ways*

POOLS are deservedly one of the most popular features of the outdoors. Their possibilities are almost limitless and the range of shape, size, material, and location makes it possible for water in some form to be a part of almost any place, however large or small. They range from the quiet mirror pool catching the reflections of sky, trees, or flowers, through pools with jets of water or fountains playing in them, wall fountains and dipping cisterns, to pools essentially built for growing aquatic plants. Where there is running or spraying water, the great effect of coolness is not entirely an illusion. The evaporation from a spray of water, particularly

if it is thrown against a wall, actually does lower the temperature near it to a considerable extent. Hence, in very hot climates or in a hot corner of the place, a pool may justify its expense as sheer practical climate control.

A pool of any size over 3 feet in diameter or length should be built of reinforced concrete. Pools built of cement or cinder blocks do not hold up well and are almost impossible to make water-proof. Very shallow pools, even if larger than 3 feet, can be formed of sheet lead bent to shape. The local tinsmith can sometimes make such a pool, of not too intricate form, with water-tight seams.



R. A. Smith photo

A mirror pool with narrow stone edge contributes to the feeling of repose of an informal garden.

Formal pools. In a living terrace or near a house or in a formal garden, the more geometric and regular shapes are usually appropriate. Building the forms for rectangular or square pools is easiest for the amateur to do, and in the proper setting such shapes are most attractive. Circular or free-form pools require a little more skill in getting the exact line in form work, and the forms are perhaps better left to a professional carpenter to build.

Dipping cistern. One of the most thoroughly practical water containers is a descendant of the old rain barrel. A dipping cistern placed at the end of a leader from the house gutters conserves otherwise wasted water from the roof and is most convenient, as its name implies, for filling sprinkling cans and for watering potted plants or seedlings near by. Since these dipping wells adjoin a house wall, they are better lined with either sheet lead or copper than made entirely of masonry. With a house of traditional architecture and of farmhouse character, the old-fashioned **rain barrel** is still a useful object. A wooden

barrel, left to weather or painted on the outside, and fitted with a screen on the top to keep out mosquitoes, will last for several years. It is particularly convenient near the cold frame or hot bed where frequent watering of small plants is necessary.

There are thoroughly practical, **ready-made plastic and steel pools**, available for enthusiasts at relatively little expense. They are formal in shape, usually either round or square or oblong, and especially designed to be of the right depth. A little ingenuity can sometimes fit them into more informal surroundings by the use of either planting or native stone laid to project irregularly around the edge of the pool.

The **naturalistic or very informal pool** is the most attractive in many situations. It is also likely to be the most difficult to build so that it both looks well and is soundly constructed. In the rock garden or along the course of a small stream, a pool of irregular form can be built so that it looks as if Nature created it instead of man. Such pools usually must be built of concrete, with the concrete hidden

either by a veneer of stone or by sheet lead or copper painted dark so that the man-made material is not obvious. With imagination and ingenuity in treating their shape and by concealing their artificiality with edges of rock or overhanging plants, such pools can be made the *pièce-de-résistance* of an informal garden or a wild garden of any sort.

Planting Around Pools

The flat mirror or reflecting pool should have very little planting near it and that planting of a form or color that throws interesting shadows and reflections into the water. Too much planting around the pool will take away from its mirror quality and actually make it seem infinitely smaller. The coping or top of a mirror pool should be as flat as possible with only an occasional accent of planting. Most geometrically shaped pools gain greatly in charm if the entire surface of the water is visible from some little distance. The mistake is frequently made of trying to cover the concrete rim of a pool with some kind of vine or solid planting. Such an encirclement usually results in the pool's looking crowded as the ivy or other ground cover gains in size, so that the pool is foreshortened and often actually considerably encroached on by the plants themselves. If a concrete pool is set in grass, beveling off the top edge so

that less concrete shows is a far easier way to handle it than trying to hide a wide and ugly piece of concrete with heavy planting.

In the more **naturalistic pool** the plants near by should be those commonly associated with water. Swamp-loving shrubs like black-alder (*Ilex verticillata*), spicebush (*Lindera benzoin*), blueberry (*Vaccinium*), and swamp azalea (*Rhododendron viscosum*) may not actually have wet feet near a man-made pool. They look, however, much more at home than do common garden shrubs like spirea, lilac, and forsythia. Similarly, marsh-marigold (*Caltha palustris*), swamp and Japanese iris (*Iris versicolor* and *I. kaempferi*), some of the mint family, loosestrife (*Lysimachia*), and many of our native ferns add greatly to the water-garden feeling of even the tiniest pool.

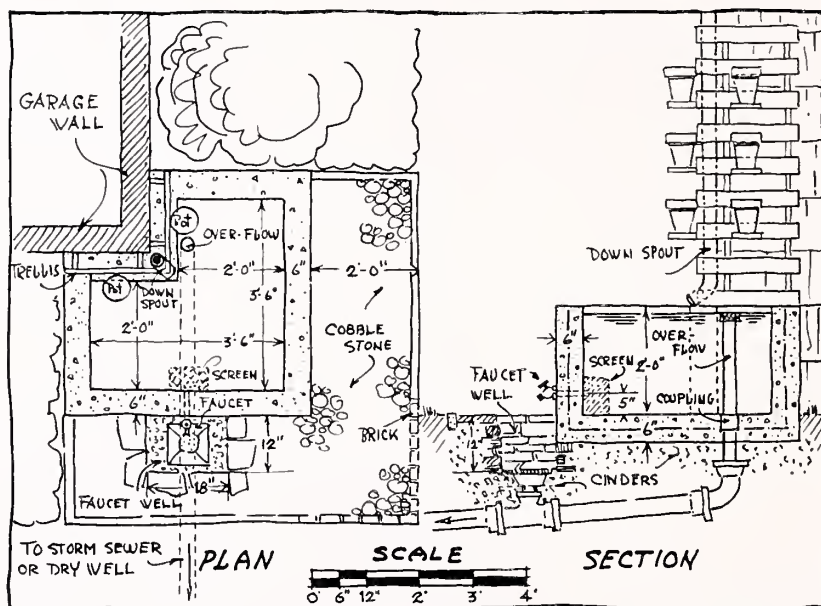
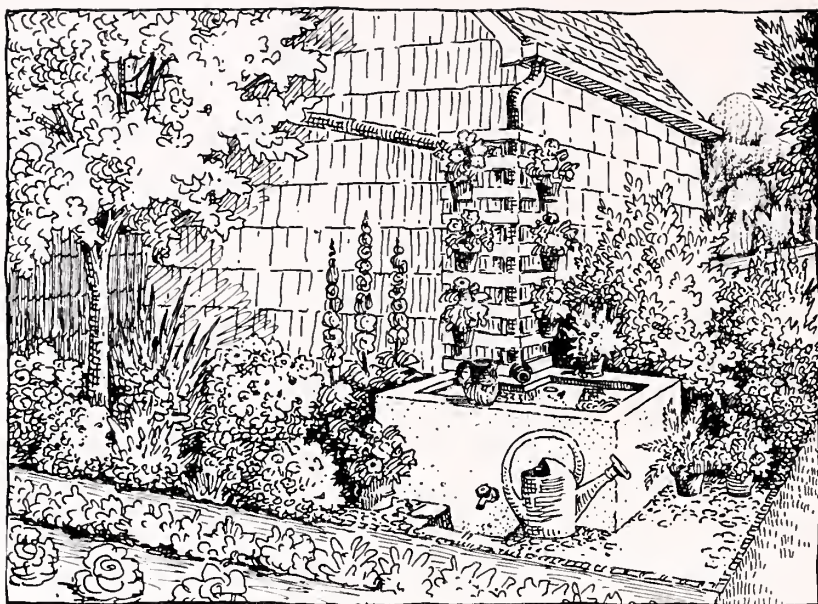
Planting in the pool itself can vary according to the amount of sun and shade and the size of the pool. It is usually inclined to grow entirely too fast and takes a certain amount of restriction annually. To grow many of the aquatics, a depth of at least 2 feet is necessary. Some of the shallow-water plants should be submerged only 6 inches, but it is easy to set them up on concrete blocks or on an overturned tub. The catalogues of specialists in aquatic plants give full directions for each type as to receptacle, depth, and culture in

An irregular pool with flat rocks overhanging the edge looks completely natural.

L. A. L. Lundquist

R. A. Smith photo





Drawing and detail of dipping cistern.

All drawings by Henry B. Aul are taken from his book "How to Build Garden Structures" and are used by permission of the author, the publisher (Sheri-

dan House, New York), and the New York *Herald Tribune*, in which they first appeared.

general. The one thing they are likely not to caution about is that vigorous-growing plants are liable to cover the entire water surface in one season, so that the pool becomes just another green area.

Construction of Concrete Pools

Excavation for a concrete pool should be made 6 to 12 inches wider than the outside of the walls and 10 inches deeper than the finished floor level of the pool. The subgrade is thoroughly tamped smooth and uniform.

Upon this subgrade a layer of cinders or clean local gravel is laid, so that after being flooded with water and thoroughly tamped the layer of cinders or gravel is 6 inches below finished floor grade.

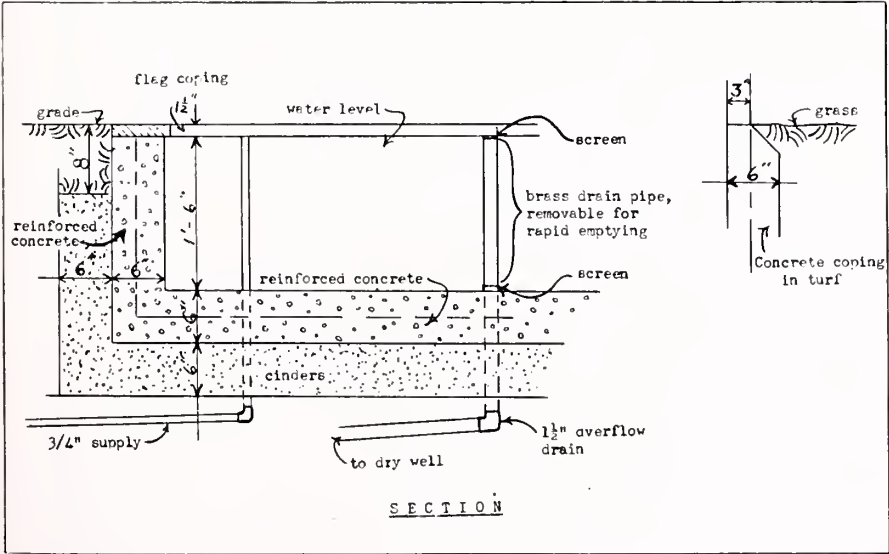
Cinders or gravel also are placed in a space 6 to 12 inches wide around the walls of the pool. After being flooded with water and thoroughly tamped, the cinders should be 8 inches below finished grade of side walls of the pool, if the pool is in grass.

Reinforcing may be of steel mesh, steel bars, or fence wire, depending on the size and depth of the pool. Consultation with a local mason is usually advisable, to ensure proper use of rein-

forcing so that there is no danger of cracking. Also, as mentioned before, except for square or rectangular pools, it is better to have a carpenter or mason construct the forms for pouring the concrete. The proportion of cement, sand or gravel, and crushed stone should be 1:2:5. If the owner is his own mason, it is advisable to rent a small concrete mixer, since floor and sidewalls should be poured in one operation. During the progress of the work the cinder subgrade must be kept moist. There should be a slight slope toward the drain in the floor of the pool.

A pool of any size should be provided with a $\frac{3}{4}$ -inch supply pipe and a $1\frac{1}{2}$ -inch wrought iron drain pipe, to be placed before the cinder subgrade for the floor of the pool is put in. A brass overflow pipe screwed to the drain at the level of the floor can be removed to allow rapid emptying. Both drain and overflow pipes should have brass strainers to prevent clogging. The drain may empty into a storm sewer or a dry well, or if the pool is a small one, into land tiles under lawn or flower beds for irrigation.

Detail of reinforced concrete pool.



OUTDOOR FIREPLACES

Fireplaces are frequently disturbing details and arguable garden subjects. Properly located, well designed, and soundly built, an outdoor barbecue can be an asset; lacking any one of these factors it is likely to look like the remains of a burned-down house with only the chimney left. Too frequently, it consumes a large part of the budget, only to have little or no use after its novelty has worn off. On the small property a fireplace large enough to be efficient is likely to be out of physical and financial proportion to everything else on the place.

A more practical solution is to use one or two relatively inexpensive portable grills for at least a season or two,

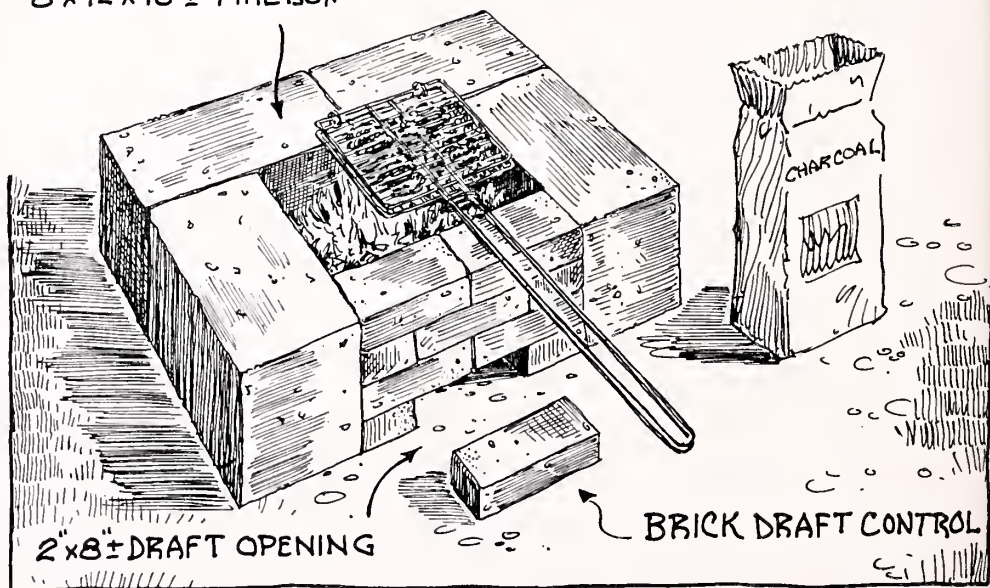
until family habits determine whether or not larger expenditures are justified, and also where the outdoor meal is most often enjoyed.

If an actual structure does seem desirable, factors of wind direction, shade or sun at meal times, and accessibility for service and for guests are practical considerations. It must be located so that smoke blows away from the dining area, and so that there are no foliage masses dangerously close to sparks or flames. It looks best and is most comfortable if set with a background of wall, fence, paved terrace, arbor, or shelter, so that the fireplace itself is an integral part of a larger landscape unit.

A temporary charcoal-burning grill is made of 4 cement blocks for the back and two sides and 5 whole bricks and 4 half bricks for the front. It can be laid without mortar and serves as an experimental fireplace for a year or two.

Drawing by Henry B. Aul

8"x12"x16"± FIRE BOX





Portable grills of iron, aluminum-baked enamel, or steel may serve as temporary expedients before the permanent fireplace is built, and later may supplement it.

Photos courtesy Hardware Age



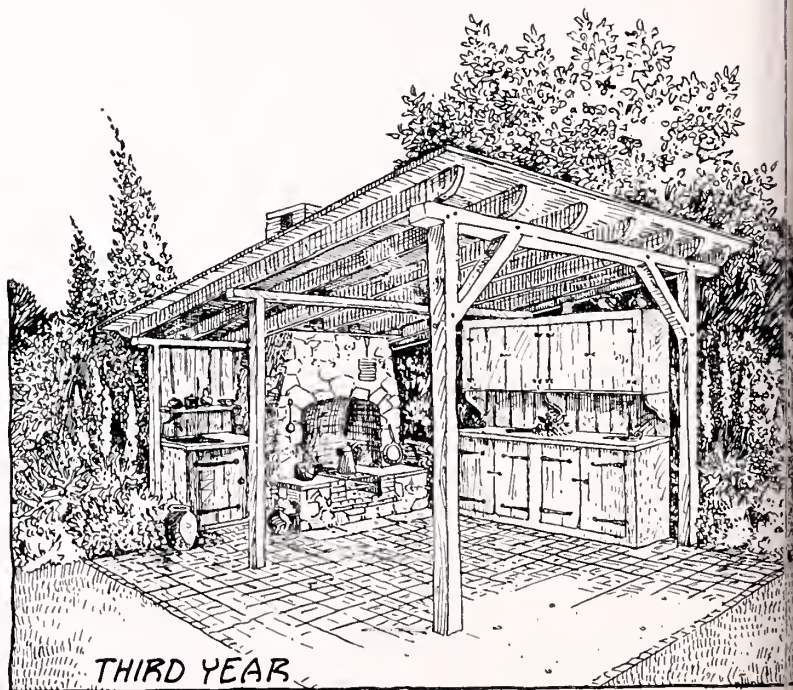
FIRST YEAR



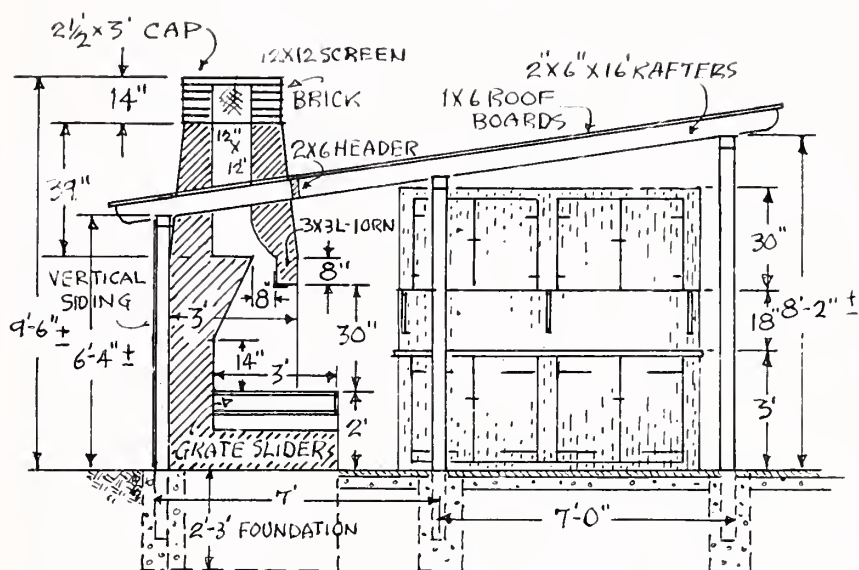
SECOND YEAR →

The expense of the outdoor fireplace may well be spread over several years. The one shown here with accompanying detailed drawing is usable even in the first year. An important factor in the fireplace is to have the iron grill removable, as shown on the drawings.

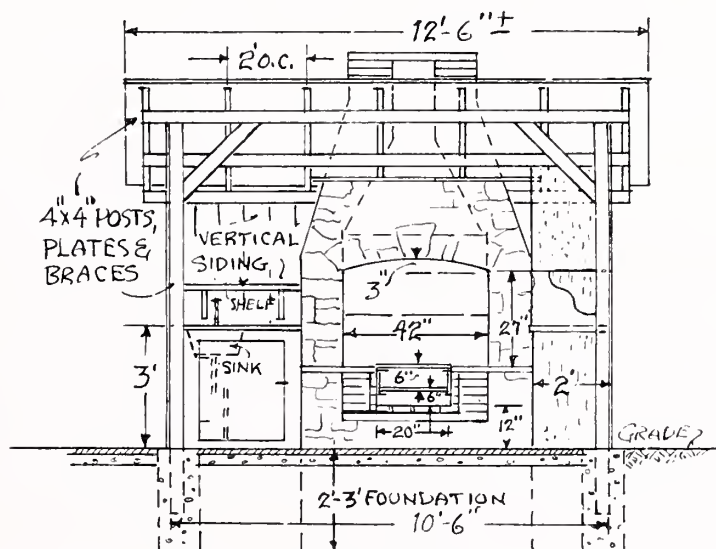
Drawings by Henry B. Aul



THIRD YEAR



SECTION - PROFILE



SECTION - ELEVATION



ARBORS AND SHELTERS



L.A. Douglas Baylis

Baer photo

Bold design and simple structure make an outdoor living room both comfortable and attractive in its wooded surroundings.



R. A. Smith photo

A simple arbor attached to a traditional house provides pleasant shade for summer living.



A broad archway with a seat on either side leads from a flower garden to a spring wild garden.

L.A. Mary Deputy Cattell

R. A. Smith photo

This outdoor living room is partly closed on the sides. The shingled roof provides protection in all kinds of weather and recedes into the well-planted background.

L.A. A. F. Brinckerhoff

Photo courtesy Alice R. Ireys



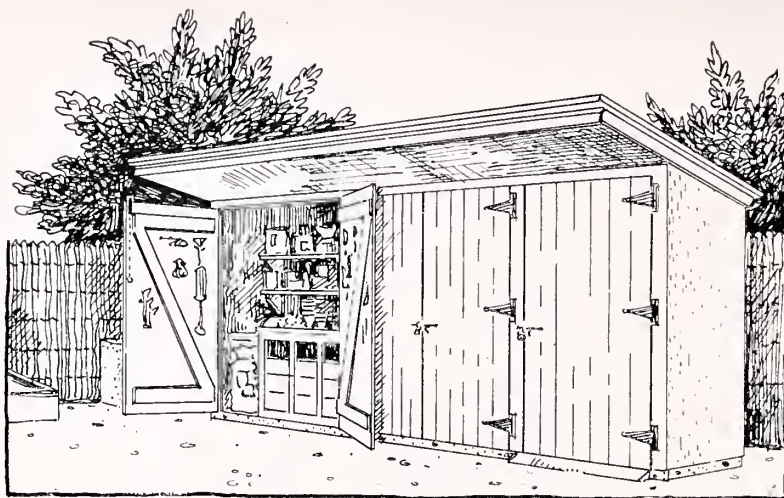
WORKHOUSES AND TOOLSHEDS

Prefabricated toolhouses are available. Easy to assemble, they can well become the center of the garden work area.



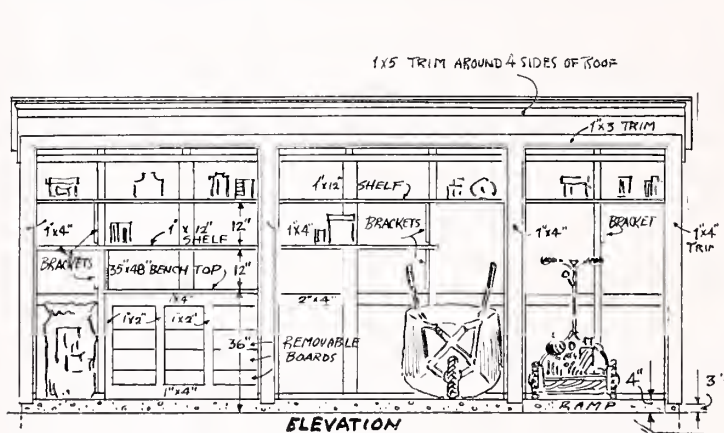
Photos courtesy Walpole Woodworkers, Inc.



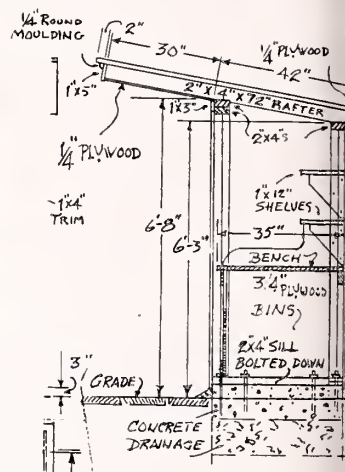


Drawings by Henry B. Aul

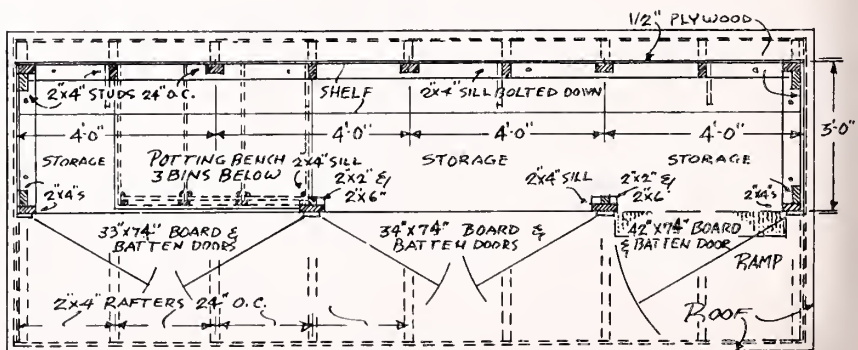
Drawing and details of a storage-wall tool shed.



ELEVATION



SECTION



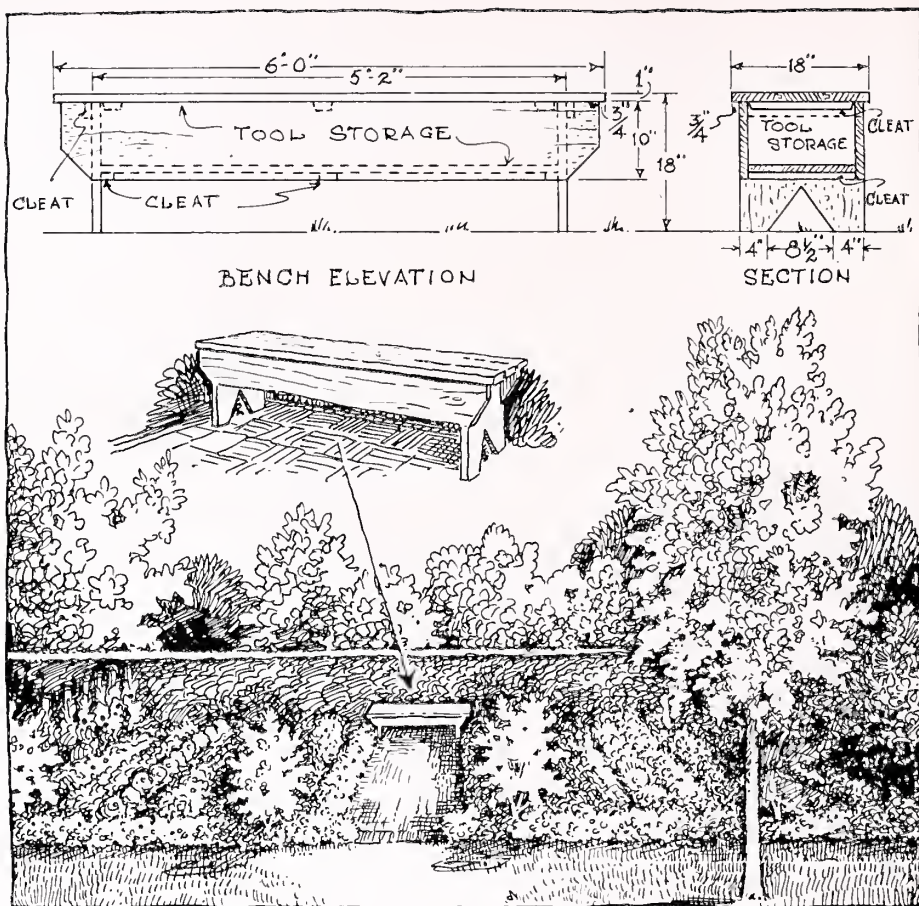
PLAN

BENCHES



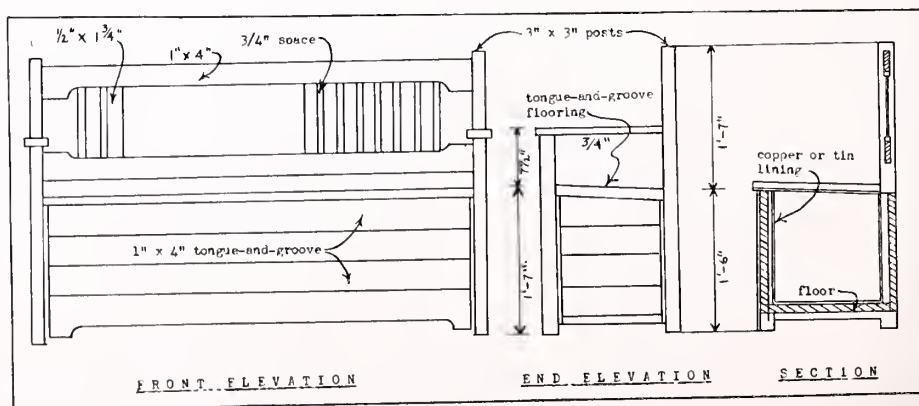
Gottschö-Schleisner photo

A wood bench of simple proportions and pleasing design is the perfect choice under the gnarled branch of a dogwood.



Drawing by Henry B. Aul

Storage for small tools in the garden is provided by a garden bench whose seat is part of a tool box. The backless one is easy to construct, while the one with the back has more tool space and is a little more decorative.



A simple concrete bench in a small city garden.



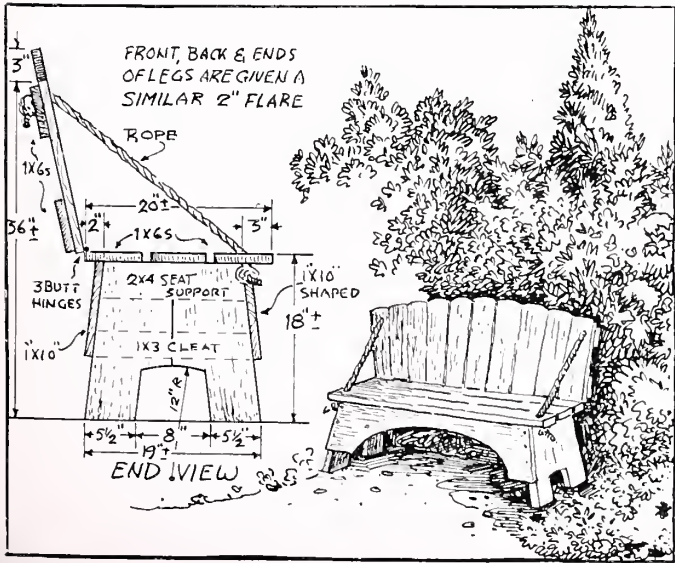
Buhle photo



F. S. Lincoln photo

A substantial table with benches attached for the picnic area or outdoor dining place. Such tables can be purchased ready-made or built at home.

Drawing by Henry B. Aul



This board and rope bench is easy to build and well suited to an informal garden.



Arched trellises
in the Cranford
Rose Garden.

Buhle photos

WITHIN THE BROOKLYN BOTANIC GARDEN

SPRING ROSE DAY

Practical demonstrations were featured at this year's Rose Day in the Cranford Rose Garden on June 2. The program was sponsored jointly by the Garden and the American Rose Society.

Nearly all of the 670 kinds of roses in the garden were in full bloom for the occasion — including numerous species roses and old-fashioned varieties as well

as the best of the modern hybrids.

Following a period for viewing the flowers, and the introduction of special guests, over 200 enthusiastic gardeners observed the demonstrations and received expert advice on spraying, foliar feeding, cutting and care of blooms, and methods of breeding new roses.

J. FRANKLIN



These arches are simply constructed from lead pipe and wire netting.

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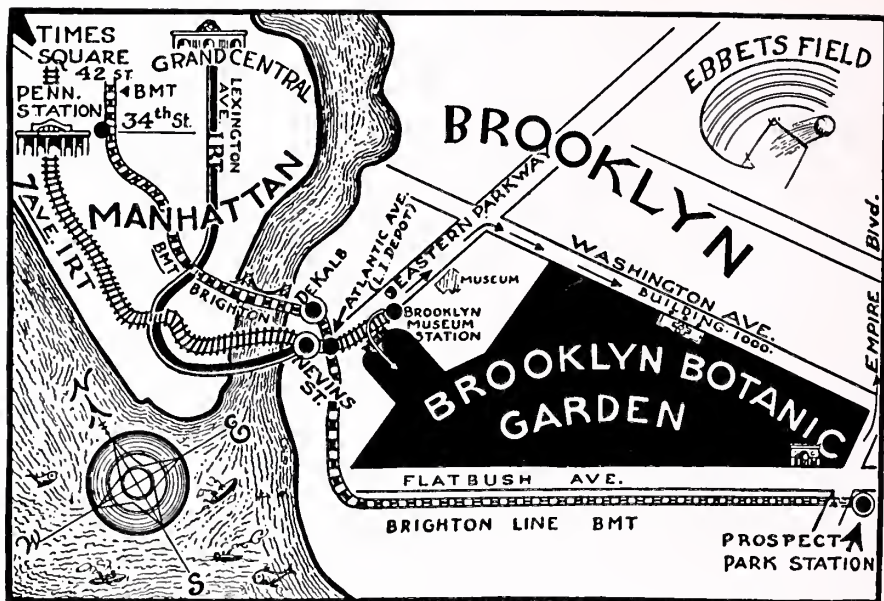
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1954

House Plants

Digest of Year's Best Garden Articles



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I.R.T., East Side (Lexington Avenue line) downtown express marked "New Lots Avenue" or "Utica Avenue" or "Atlantic Avenue," to Nevins Street; step across platform and change to 7th Avenue or Broadway-7th Avenue train, ride to Eastern Parkway-Brooklyn Museum Station.

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From Long Island, take Eastern Parkway westward, and turn left at Washington Avenue.

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PLANTS & GARDENS

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PLANTS

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AUTUMN
1954

NEW SERIES

PL. 10

NO. 3



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Editorial

BESSIE R. BUXTON, *Guest Editor*

PETER K. NELSON, *Associate Editor*

and the Editorial Committee of the Brooklyn Botanic Garden

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Buhlo

Terrarium—a small green world

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Autumn 1954

From cottage windows in Lappland to South American patios, plant "pets" have varied and wide appeal.

As varied as the plants they choose to grow indoors are the people who are challenged by this hobby. Doctors, lawyers, business men, nurses, secretaries and many housewives enroll in Botanic Garden courses on house plants. Like outdoor gardeners they are anxious to exchange experiences, learn of new varieties and try different methods. It often seems that the greater the cultural handicaps, the greater the determination of many enthusiasts to keep trying. Some people are satisfied with refreshing green foliage, others are interested only in plants that have showy blossoms. But for whatever reason, house plant culture is an almost universal avocation in the civilized world.

People sometimes ask what constitutes good taste in house plants. This is a controversial subject and one that Guest Editor Buxton and invited contributors have carefully avoided. Situations vary — with the person and with the setting, but a well grown plant is an asset in any situation. Perhaps it is enough to say that *Sansevieria* is never equal to *Gloxinia*, but properly used, it too has its good points.

May this Handbook on House Plants play a helpful role in your everyday living.

Sincerely yours,

A handwritten signature in cursive script, reading "George S. Rosny, Jr." The signature is written in dark ink and is positioned centrally below the typed name "George S. Rosny, Jr.".

Director

PLANTS, CURIOSITY, AND STUBBORNNESS

Adventures of an enthusiastic amateur

Edmund C. Berkeley

Ever since I was old enough to remember, I have loved the outdoor world of things growing in the sunlight, I have been intensely curious about many aspects of that world, and I have been obstinate and stubborn. Finally, in 1936 (when I was 27) after a hike all day in glorious autumn weather, and an attack of obstinate protest over the coming of winter, I gathered some plants from the woods — checkerberry, mountain laurel, sphagnum moss and some other mosses, some baby hemlock trees, etc.—and bought myself a small glass tank and planted a

terrarium. It was 12 inches long, 6½ inches wide, and 8 inches deep; and that winter while all the outdoors was gripped in icy cold, I could enjoy the fresh sweet smell of the deep woods as soon as I lifted off the glass cover and put my face down inside. It gave me a feeling of intense satisfaction and triumph.

Now, eighteen years later, that terrarium is still growing with the same mountain laurel and the same sphagnum moss, although its other plants have gradually given up and died. Why did those survive and the others die? Some day I'll know.

Small terrarium, ideal for many kinds of plants

Buhle





Buhle

Pitcher plant (*Sarracenia purpurea*)

Wild Plants

What other wild plants could I make grow? I have tried the following: oaks, sprouted from acorns (lasted about four years), sundew (lasted about two years), pink lady-slipper (about two years), the wild orchid called twayblade (three years, and bloomed for me twice—killed by bulb rot), pitcher plants (three years and still growing excellently), white violets (do excellently—bloom in late February and go to seed; the seeds sprout), wild asters (do well and bloom, but need a dry terrarium), arbutus (many years, and thrive, but I have not managed to make it bloom yet—it is susceptible to fungi, but bordeaux mixture is a cure). Blackberry lily (*Belamcanda chinensis*) sprouts from seed, and grows well, but finally has to be moved out because it gets too big (I can give a few seeds to whoever wants them), the wild purple fringed orchid (lasted one year—killed by a fungus that came in with it from the woods, and blackened it completely), and many kinds of mosses and ferns that I don't yet know how to identify. So much interest and excitement, at almost no cost!

Tame Plants

Naturally enough, the first tame plant I experimented with was a begonia, one with pink stems, green leaves, and pink blossoms. It was fun to put cuttings of the stems in little glasses of water and make more plants. How much could I do with begonias? I have grown pink-flowering, white-flowering, single-petaled, multiple-petaled, and many other kinds. I have rooted them from stem and leaf cuttings, pollinated the flowers, planted the seed, and watched the seedlings grow. Many, but not all of them, succumb to damping-off fungi, which I have not yet learned how to deal with practically.

What could I do with African violets? I could from the start (1938) make them grow luxuriantly, but they would not bloom for me. One day six years later when I had not watered my plants for four days and they had sat on a window sill facing the north light, I came back to find that buds had started to come on all of them—so the answer was LESS WATER. I have rooted leaf and stem cuttings in little glasses of water, and nowadays I pour in a little nutrient



Buhle

Pink lady-slipper (*Cypripedium acaule*)

solution (from a quart bottleful made with $\frac{1}{4}$ teaspoonful of A. C. Gilbert's nutrient for soilless culture, which does wonders for me, and I don't have to bother mixing chemicals). Every spring and autumn I give away beautiful flowering African violets—they are in perfection, my curiosity is all satisfied, and I have their leaf cuttings busily producing new plants for the next season.

And, of course, I somehow acquired from time to time and lost again: cactuses and succulents (they died—too much water), nephthytis and philodendron (grows forever with any kind of treatment), marigolds and gardenias (the red spider won out), kalanchoe with its red flowers (bloomed pretty well, but gradually died—probably too much water but I have never found out—I guess so far I am just temperamentally unable to let plants really dry out), geraniums (never grew well for me), ivy (I surrendered to scale insects, saying "Well, they won't bloom anyhow!").

Gloxinias

In June, 1949, twice a day I walked by a certain florist, and there in his window one day was one of the most gorgeous plants I had ever seen: three great, brilliant, magenta, tubular blossoms, and big thick green leaves. After three days of going by it morning and evening, I broke down, and went in and bought it for three dollars—"gloxinia." Would these thick leaves root like African violet leaves? I promptly cut off two leaves and put them in water to see if they would; and they did put out roots.

In the autumn the plant in its pot seemed to get sick and die, and the leaves, which I had put into a terrarium, died too. I dug in the earth of the pot somewhat later, and found a rotten bulb. But the next spring two curious little green buttons appeared in the terrarium and as they grew, I recognized them finally as gloxinia. I put them into pots and by midsummer they were large and flowering beautifully. Phoenix! This was all unexpected to me, for I found no book on gloxinias until 1953, and I never heard of the gloxinia magazine until 1952.*

So gloxinias were exciting too. What could I do with them? I fertilized the blossoms, got seeds and sprouted them, and one of my seedlings has bloomed—white with a rosy network of veins all over the petals. I have tried stem cuttings and leaf cuttings, and seedlings in all sorts of places—humid in my terrariums and in dry air on the shelves of my room. But why do so many of the buds blight and wither? "Bud blast" seems to be the name for it; I don't know why it occurs and the book does not say why. And I have not mastered the amount of light for gloxinias either.

Then last summer my plants had an attack of thrips. It took me months to find out what the insects were, although I started spraying for them sooner. They came in through the open windows, I

*THE GLOXINIAN: official publication American Gloxinia Society.

think. I fooled around for months with a sweet-smelling pyrethrum-nicotine spray supposed to be very good, but it did not work for me. A few days later, and the thrips were back. Finally, Miss Alys Sutcliffe of the Brooklyn Botanic Garden said, "Use DDT." I bought some 50 per cent wettable DDT, and one spraying of the plant eliminated the adults, nymphs, and eggs.

My gloxinia status now is: store the bulbs in a terrarium during the winter, preferably in living sphagnum moss which seems to be wonderful for them; plant them in pots in the spring; and how, oh how, can I make every bud bloom?

Orchids

In the spring of 1952, I walked by a locked-up university greenhouse and then around it, looking in, and by then I just had to figure out a way to get inside. Finally, the gardener was found, and he kindly let me in and gave me various kinds of plant stock, including—glory of glory—some orchids: stem shoots of the tall-growing orchid with spikes of little red flowers (*Epidendrum obrienianum*) which I am told makes hedges in California and the West Indies, because it grows so profusely and well.

Well, there I had five or six cuttings of an orchid, and I did not know what in the world to do next. I put them in water and the leaves slowly darkened and the roots looked sick. I was given a couple of chunks of osmunda fiber in a florist's supply store, and I planted them in that; they got sicker. I said to myself this hard wiry stuff, osmunda fiber, that I could not keep moist in an apartment, was nonsense. I got a wick-fed plastic pot, filled it with vermiculite, put in nutrient solution, put it inside a small tent with wooden frame and with translucent plastic sheeting around it; and the epidendrum leaves grew green, and more leaves came. I put some of the epidendrums in my terrariums; they flourished.

In my search for more help and information, I went to the Brooklyn Botanic Garden and the Arnold Arboretum, and

Dr. Carl Withner of the Garden and Mr. Lewis Lipp of the Arboretum gave me a great deal of help, and some more specimens of orchids to experiment with.

I have now arrived at two large tents, made of wooden frames and translucent plastic coverings. All my orchids (except cymbidiums) are in vermiculite, either in ordinary pots sitting in saucers, or in wick-fed pots. The two seem equally good. The Gilbert nutrient solution is poured on them about once in two weeks, and just water the rest of the time. The pot sits a day or two without water in the saucer. Extra humidity inside the tent comes either from an empty pot set in a saucer evaporating water from its whole surface, or from a pan with water and gravel.

The pay-off came this June: some of my orchids flowered! *Maxillaria tenuifolia*, with 2-inch deep red blooms and a wonderful spicy smell, flowered for four or five weeks; and *Epidendrum ionophlebium*, with its 1-inch greenish-white flowers, bloomed for six weeks. No osmunda at all!

The *Cattleya* stems are filling out thick and chunky, and seem to be growing well, and so is the *Oncidium sphacelatum*. But the dendrobiums seem to me a little peaked. Why? What can I change for them?

The Future

Like every plant experimenter, I want a greenhouse, but it seems to me now that probably I will not get it. Partly it is the cost and the time, and partly it is the fact that I want to see if I can't make contraptions to use in an ordinary apartment with a sunny window so that astonishing things can be done. I want to work out simple cheap automatic controls for humidity, watering, feeding, light, and temperature. And one day, why can't I grow ripe red tomatoes all year 'round in my sunny window—just like the ripe red tomatoes I picked and ate one day in March, 1945, in a greenhouse. Why can't I?

LIVING PLANTS IN HOME DECORATION—A DOZEN IDEAS

In laundry or kitchen, living room or bedroom, plants properly used beautify and brighten a home. These pictures—of plants singly and in groups, and in a variety of settings—suggest a few of the endless possibilities for their effective use.





McFarland



Roches



Roche photos





K. A. Smith



Roche



McFarland



R. A. Smith



R. A. Smith



Roche photos



GROWING HOUSE PLANTS IN A CITY APARTMENT

*How one grower has succeeded
in growing fine plants in a hostile environment*

Louis J. Kuester

PERHAPS no environment surrounding house plants offers more challenge to the skill of the indoor gardener than that of the average city apartment home.

The dust and polluted air, high temperature and low humidity of city apartments, and the limited facilities for resting plants are handicaps not usually encountered in other locations.

Despite the difficulties, many city people grow at least a few house plants. For those who are interested in going beyond just growing the "toughies," I hope I can offer some help, by outlining some of my methods in growing many kinds, from snakeplants to orchids, in a New York City apartment.

On Window Sills

Most of my plants are grown the year 'round on window sills. Windows face southeast and southwest. Installed on the window sills are galvanized metal trays. They are 2½ inches high, and as wide and as long as the sills, and are filled with water. Wooden racks, built of spaced strips (see photo) are fitted over the tops of the trays. The potted plants rest on these racks and do not stand in water.

One window (7 feet long) has a long low radiator in front of it. A conventional radiator enclosure is used with the top lined on the underside with a sheet of heavy asbestos. There is also a tray, 4 feet long, resting on top of the radiator. The total water content of these trays is about 15 gallons.

Several tests with a humidity gauge indicated that the relative humidity in the

immediate vicinity of the window plants was about 15 per cent higher than the remoter areas of my apartment. Since temperature is usually lower near the windows, some allowance must be made for the above-mentioned figure. My best estimate is that the presence of water near the plants increases the relative humidity about 10 per cent. This is not much in a low humidity environment, but it helps. If my humidity gauge is not wrong, it is my opinion that the use of small dishes containing damp moss or water is of little value.

Enclosed Case

Some plants are housed in a large 3x3x4-foot wood case (see photo) with a glass top and three glass sides. This case is used for rooting cuttings, transplants, and for established plants needing high humidity.

According to the humidity gauge, the glass case provides a relative humidity ranging from 60 to 90 per cent, the ideal humidity for many plants. This is its principal advantage. Because of its location, the light intensity is low and the temperature too high for many plants. However, some of the shade plants requiring high humidity do well in this case. For use on dark or short days the case is provided with 80 watts of fluorescent lighting, installed above the top.

Unfortunately for the plants, my personal preference for temperature is on the warm side. The only adjustment possible in respect to the temperature factor, is to confine most of the plants to the cooler window areas.



Author photo

A window in the author's apartment

Reflected Light

Although I have not explored the value of reflected light, I do try to increase it, in the hope that it will benefit the plants. I have used white paint on the racks, water trays, and case.

Soil and Fertilizers

For potting soil for most plants I use about 2 parts of average garden soil, 2 parts of peat (usually Michigan peat), 1 part of sand, a sprinkle of coarse ground charcoal, and 1 teaspoonful of agricultural limestone to every quart of the mixture. The lime apparently counteracts the acidity of the peat.

For newly rooted cuttings, I add to this mixture some peat and some vermiculite. For African violets, ferns, certain begonias such as *B. rex*, *B. imperialis*, and *B. goegoensis*, and some other

plants, I add an extra part of peat and a little more sand. Leafmold can be used in place of the peat, but should be free of disease and well decomposed. Leaf mold that is not well broken down will burn the roots.

Though many gardeners include fertilizers when making up their potting mixtures, I do not use them at that time. I prefer to use them later, because I think it gives me better control of the feeding program.

For heavy and fast growing foliage plants, I like to use a fertilizer high in nitrogen with a formula of the proportions of about 10-6-4. For flowering plants, I like a formula high in potassium but lower in nitrogen, about 5-10-5. How often I feed a plant depends on the size, rate of growth, and the extent of the root system.



Author photo

Glassed-in case with overhead fluorescent light fixtures

Gas

As is well known, gas for cooking and heating is destructive to plants. Though the city dweller living in a multiple apartment house may take precautions to prevent leakage of gas in his own apartment, he can do little to prevent leakage that may reach his home from the apartments of his neighbors. The best insurance is frequent ventilation without direct draft on the plants.

Pests

Most of the pests that I have had to contend with were brought in on newly acquired plants. Though a visual examination will reveal some insects, if present, the eggs that may be on the plants or in the soil are difficult to detect. For this reason, I quarantine newly acquired plants for at least a month.

A few of the most troublesome pests are mites (cyclamen mite, broad mite, and common red spider), several species of plant scale, and root and leaf nematodes. I get good control of red spider mite with nicotine sulphate or rotenone. For scale, I like Volek's oil spray for those plants that are not damaged by oil. For broad mite I use fine dusting sulphur.

I have not found it worthwhile to treat plants infested with cyclamen mite and leaf nematode; I destroy these plants. To get rid of root nematode, I take top cuttings from infected plants and after washing them thoroughly with water, start new plants. The remainder of the infested plant is destroyed. Because of the danger to humans and some young or tender plants I do not advise the use of sodium selenate (by amateurs) for the control of any plant pests.

Water

Several years ago, I experimented with the use of rainwater for watering plants. So far as I could determine, it offered no advantage over New York City tap water.

Though I use water rather generously, none of my plants suffer from too much water at the roots. For those who are too handy with the watering can, my practice of using plenty of drainage material in the bottom of a red clay pot, filled with

a loose, porous soil mixture, is advised. Unless the gardener is a good judge of the moisture needs of a plant, he should avoid glazed pots without a drainage hole, pots too large for the plant, heavy clay soil mixtures, and the practice of watering on dark and sunless days.

To grow handsome house plants in a city apartment does require extra care, but I, for one, have found the rewards well worth the trouble.

HOUSE PLANTS AND ARTIFICIAL LIGHT

WITHIN recent years, especially since the advent of fluorescent lighting, many large commercial greenhouse owners, in regions where winter days are very short, have turned to the use of artificial light to supplement daylight. Owners of the increasingly popular hobby greenhouses are finding that they too can profit by the use of supplementary light during winter. Even in a basement, fluorescent lights give light enough to keep geranium cuttings and odds and ends of plants used in window boxes in summer, in good condition during winter.

Some gardeners glass over basement areaway windows and, if necessary, sup-

plement the daylight with fluorescent light. Here house plants thrive during winter months, deriving sufficient heat from the basement.

Another way to use artificial light on a small scale to add glossiness and color to house plants is to place them under floor lamps or table lamps, or on an end table near a light during the evening. I do this with begonias, coleus, and fancy-leaved geraniums. The calla-lily begonia responds to this treatment in an amazing fashion—it has glossier leaves, sturdier growth, and more blossoms. Other plants may react equally well; it is well worth trying.

DOROTHY P. BARTON

A cellar window greenhouse



Author photo



Author photo

House plants moved to an open shed for summer

SUMMER CARE OF HOUSE PLANTS

*Where to put them outdoors, so they will require less care;
how to propagate them for winter*

Bessie Raymond Buxton

SPRING comes slowly, reluctantly, in New England and many other parts of the United States, but the increasing heat of the sun warms the earth and the spring bulbs begin to stir and bloom. Every true gardener responds to this call to go out and dig in the soil; but there are the house plants still to be cared for. Torn in two directions, one begins to plan how he can lessen house cares, in order to spend more time in the garden. Which plants can be temporarily put out first—and how soon?

Porch and Cold Frame

Seasons vary, but near Boston it is usually safe to put out English ivy (*Hedera*), *Sansevieria*, and *Billbergia* on a sheltered porch in early April. If the thermometer drops to 40° in the late afternoon, the plants should be taken in for the night.

By mid-April, geraniums may be set

in a big cold frame, under glass, with an old tarpaulin at hand for protection against sudden cold.

Other plants follow gradually, as the season advances, begonias being the last to go out. By mid-May, the glass on the cold frame may be replaced by lath covers.

Out in the Garden

Geraniums are the first to be set in the ground. True, many of the leaves will turn yellow and fall; but this always follows planting out, and the sooner they fall, the sooner the new leaves replace them. These South African natives should have full sun. Even if the summer is dry, they need very little watering. Choice varieties, the expensive kinds, are kept in the frame, under lath, for safety.

Billbergia and *sansevieria*, although they are natives of the tropics, have

leathery leaves and will stand cool growing conditions. Because their roots are small, fall transplanting is easy; hence they can be set in the ground, with high shade. Like geraniums, they need no special care during the summer, and by fall there is much new growth.

Begonias may be set on the sheltered porch by mid-May, and set out by early June. Plants that have grown so tall that they cannot be used again in the house, may be set in the ground, in partial shade; there they will grow vigorously, and in the fall some florist will gladly take them for stock plants. They must be watered occasionally. Small plants, as well as the rare kinds, are best kept in the frame, under lath, or on the porch.

Succulents and cactuses find suitable summer homes in the rock garden, in full sun, and need only occasional watering with the hose.

Amaryllis bulbs should be taken from the pots in early June, and set in the garden, with some bone meal worked into the soil under them. Water should be given occasionally. The bulbs will produce the strong new leaves that will "put a bud in the bulb," as the florists say. In September they should be potted, with three quarters of the bulb above the soil. The pots should be set in a sheltered place, and water should be withheld gradually until the leaves become dry. Then the pots should be put in a cool, dark place until the buds appear, in December or January. No water should be given unless the bulbs feel soft and spongy.

Veltheimia viridifolia is a South African bulb and must have the hot, dry summer conditions of its native land or it will not bloom. The leaves are brilliant emerald green, with beautifully ruffled edges. It blooms in March, tall spotted stalks bearing a cluster of tubular pink flowers. When the leaves begin to yellow, water should be withheld gradually until all have withered. Then the pot of bulbs should be set in a sunny window and not watered. In late September, when the first bit of green appears in

the center of the bulb, the pot should be watered well. This is one of the best bulbs for house culture, blooming well and increasing the bulbs each year.

On Porch All Summer

Californians make a mossed wall on the porch by fastening chicken wire loosely over the wall and packing sphagnum moss around the pots, which are hung there. New Englanders rarely do this, but content themselves with suspending the pots on hooks or using wall brackets. A search of the attic, or perhaps the second-hand stores, will discover old wrought iron brackets, originally designed for kerosene lamps, some with holders for two or even three lamps. These make excellent wall brackets for plants after a coat of paint has been applied. All hanging plants do well in this location, also ferns.

Wire stands or tables hold upright growers, and anyone with a good sense of arrangement can make the porch a thing of beauty. A fine spray from the garden hose makes the daily watering an easy chore; but a thorough watering is necessary occasionally, as well as the morning spraying.

Cuttings

By the last of June, when the garden is in condition and transplanting is finished, house plant work must start for the winter. This is the time, if the plants have made good growth, to start cuttings for the coming season.

Begonias come first, because they have usually made quicker growth than geraniums. Tip cuttings may be made of all the fibrous kinds; and sections of the rhizome (about 2½ inches long), of the rhizomatous kinds. These, laid on sand and half covered, root quickly. Three inches is a good length for a cutting; but all cuttings should have a soft top and a firm (not hard) base, to root well.

Rex begonias should be propagated in the spring, when the plants start into growth; not in the fall, when they are approaching their dormant season. A firm, mature leaf may be taken off, and

its stalk removed. A series of small cuts may be made at the junction of the veins, and the leaf pinned down on a bed of moist sand. Slowly, but eventually, small plants arise at the cuts. When a little plant has several fair-sized leaves, it may be removed and potted. Another method is to cut the leaf into triangles, with the base of the triangle at the junction of the veins. The base of the triangle should be set in the sand.

Rooting medium. Every gardener has his favorite rooting mixture. Some use clean sand, others favor a mixture of half sand and half peat, or finely ground sphagnum moss. A California friend thinks sponge rock is ideal; and there are various commercial mixtures for this purpose. I use wooden flats, filled with the rooting mixture, well watered and drained before the cuttings are set. A tag bearing the name should be placed close to each cutting. Then the flat is set in the garden where it is partially shaded, and watered just enough to keep it moist.

Geraniums require the same procedure. If rains have been frequent, the tips will be too soft to root well, and the base must be hardened before it is set in the flat. A slanting cut may be made, halfway through the stem, just below a joint; and the cutting taken off several days later. Another way is to take cuttings off and lay them on the ground until the base hardens and a callus forms. All cuttings should have lower leaves trimmed off, with only two left at the top. Roots will form in about three weeks.

Cactuses and succulents. For making cuttings of these plants, a very sharp knife should be used. The cuttings should be laid in a dry, well ventilated place until the cut surface is well callused over, before they are set in the sand. Very little of the cutting should extend into the sand, and it may be necessary to stake it to hold it upright.

Potting

The next task is potting. A 2½-inch pot is the best size for the first potting.

A handful of pebbles in the bottom gives good drainage, and a bit of sphagnum prevents the soil from washing out. When the pot is half full of soil, the little plant should be set in the center; soil should be filled in around the roots carefully, and a space left at the top for watering. Geraniums need firm potting—the soil tamped down with the fingers until the cutting is firmly set. Begonias need a looser potting—tapping the pot on the bench will settle the soil sufficiently.

Potting Soil

Soil mixtures for these plants vary. Geraniums need good garden soil, heavy enough to tamp down firmly. No fertilizer is used for the first potting.

Begonias should have a mixture of 2 parts sandy loam, 1 part clean sand, ½ part old leaf mold, and ½ part well rotted cow manure, at least 2 years old. Begonias do well in oak leaf mold; one may be generous with the leaf mold, for it is the native soil of begonias.

If the small pots are set in a flat a quarter full of sand, less watering is required.

By early September (possibly earlier) the plants are ready to shift to larger pots; now bone meal may be added to the soil for the geraniums, and more leaf mold and cow manure to the begonia soil.

Cactuses and succulents need a lighter soil, with more sand. Two parts loam, 2 parts sharp sand, and 1 part finely crushed flower pots may be used, with a 5-inch pot of bone meal added to each bushel of the mixture. At least an inch of pebbles or broken flower pots should be put in the bottom of each pot, because cactuses and succulents must have perfect drainage.

Indoors Again

Plants should be taken into their winter quarters before the fires are started, and while windows and doors are still open, for fresh air is literally the breath of life to them. Even in winter, plants must have fresh air in the middle of the day, unless a blizzard is raging.



Vriesia carinata

Genereaux

UNUSUAL HOUSE PLANTS

Some different, beautiful plants and how to grow them

Helen B. Farnham

HOUSE plants have always been popular, and are becoming increasingly so. Luckily, because of this, we now find growers offering a greater selection of plants, many of them rare.

Bromeliads

For a modern interior, few plants can surpass the decorative bromeliads, with their symmetrical forms and unique colorings. Nor are they difficult to grow if certain requirements are met. A soil formula I have found satisfactory consists of one part fibrous loam, one part leaf mold, one part peat moss and one part sharp sand, with small bits of broken charcoal added. Even *Vriesia carinata* has been

grown successfully in this mixture, although osmunda fiber is usually recommended for this plant. Good drainage is essential, so be sure not to over-pot and to have plenty of broken crock in the bottom of the flower pot. It is also important not to plant too deeply. The basal part of the leaves should be above the soil. Good light is necessary for best leaf color but strong sun may burn the foliage. Water is given sparingly at the roots in winter but the leaf cups are kept filled at all times.

For low tables *Cryptanthus zonatus* is unusual and decorative. This grows about 4 inches high and has an approximate



Billbergia leptopoda

spread of 10 inches. The stemless plant forms a rosette of leaves marked with transverse bands of cream and brown, and the leaf edge is wavy. *C. zonatus* hybrid is similar but unstriped, the leaves being a soft shade of gray. *C. beuckeri* has a longer leaf stem and very pale green

Columnnea tulae

Genereaux photos



leaves mottled with darker green. The flowers of these plants are white and stalkless, nestling in the center of the plant.

Vriesia carinata has a fascinating flat spike of scarlet and yellow bracts. The plant is dwarf in habit and forms a rosette of pale green, shiny leaves.

Aechmeas are favorites of mine. Two in particular are fine. *Aechmea weilbachi* has a rosette of soft green to bronze-red foliage and a red-bracted flower stem topped with lavender berry-like blossoms. The hybrid BERT is tubular in form, the light green leaves mottled with dark green, their margins edged with brown teeth.

Relatively new, *Billbergia leptopoda* is a fine house plant. Its curled leaves are spotted green, and its blossoms of red, blue and yellow are superb.

Gesneriads

Since African violets (*Saintpaulia*) have taken the country by storm, other members of the Gesneria family are coming to the fore. *Columnnea tulae* var. *flava* is a lovely trailing plant, with tubular yellow flowers borne in the axils of the small soft green leaves.

Trichosporum pulchrum, another trailer, has broadly ovate leaves of dark green and scarlet flowers with yellow throats. After blooming, the plants should be pruned back to within 6 inches of the base. Plant in shallow pots with perfect drainage and give a shady location.

Isoloma ceciliae has downy brownish-green leaves, a compact habit of growth and lovely deep rose flowers. By the time the plant has finished blooming, the creeping rhizome has usually sent up new shoots, which, after they have reached about an inch in height, may be removed and planted in small pots of porous soil.

The first two of these gesneriads do well in the potting mixture recommended for bromeliads, while *Isoloma ceciliae* may be grown in 1 part loam, 1 part peat moss or other humus and 1 part sand. A warm temperature suits them all.

Vines

If the familiar philodendron seems too commonplace, try *Scindapsus pictus* var. *argyraeus*. This also has heart-shaped leaves but they are deep green, satiny, and beautifully marked with silvery-white spots. Grow it trained on cork bark or as a hanging vine. Give it good light, moisture and a porous soil.

Two equally good vines are the cape-grape (*Cissus cupensis*), and the kangaroo-vine (*Cissus antarctica*). The former has leaves resembling those of the grape, but the young growth is attractively rust-colored when grown in strong light. The kangaroo-vine will grow well with less light if necessary. The dwarf form is very desirable though it may be hard to find at present. This is a mutation of *C. antarctica* which appeared in the greenhouses of W. A. Manda, Inc., 3 Street, South Orange, New Jersey. It has fairly thick, shining, dark green leaves and branches freely, so that it presents a compact appearance. Spray the foliage with water occasionally to keep it clean and shining.

Calla-Lily Begonia

A bit more taxing to the skill of the grower is the calla-lily begonia (*Begonia semperflorens variegata*). This has the reputation of being temperamental and many methods of growing it have been suggested. The basal leaves are green,



Trichosporum pulchrum

then come leaves heavily spotted with white, and finally, pure white leaves shaped like tiny calla-lilies. Easiest to find are those with single blossoms of red or pink, but the loveliest, to my mind, is the variety with very double flowers of light, clear pink. When one acquires one of these, learning to water it carefully is the problem; excess drying will cause the stems to become brittle and drop, while overwatering results in rotting of the roots. When the topsoil seems slightly dry the plant should be watered thoroughly, either from the bottom, or the top. Keep the foliage dry.

Genereaux photos



Cape-grape
(*Cissus cupensis*)



*Tradescantia
blossfeldtiana*

Muller

PLANTS FOR HANGING POTS

Charming in themselves, they afford a means of expanding a plant collection

Bessie Raymond Buxton

NO real plant lover ever has room enough for all the plants he wants to grow, whether he grows them in a greenhouse or in the windows of his home. When the window sills and plant stands are full, the hanging pot offers yet another possibility.

Many plants, because of their trailing habits, grow better in hanging pots than anywhere else.

Hanging Plants with Showy Flowers

The **Star-of-Bethlehem** or falling-star (*Campanula isophylla alba*), an old time favorite, is one of these. It has a long period of bloom, beginning in midsummer and continuing until past Christmas. The

cascade of white flowers against a green background is most attractive. (*Campanula isophylla* has blue flowers.) It does best in a northeast or a southeast window in a cool room. If the room is too warm, and the leaves turn yellow, look on the underside of the leaves for the webs of the red spider. Sharp sprays of cold water will usually dispose of them if repeated daily for a week or ten days. After such daily sprays, do not replace the plant in a sunny window until the leaves are dry, or they will burn. When the flowers are gone, cut back all the blooming sprays and repot. New growth will start at once. The green tips may be rooted in sand.

For sunny windows there are several fine plants. *Streptosolon jamesoni* is a winter bloomer bearing clusters of orange flowers. Another attractive winter bloomer is trailing lantana (*Lantana monteriden-sis*). It should be kept well watered. Little-pickles (*Othonna crassifolia*) has fleshy, cylindrical leaves and small, yellow, daisy-like flowers. It blooms constantly and will endure heat if given plenty of water. The well-known ivy geraniums (*Pelargonium peltatum* and *P. lateripes*) thrive in hanging pots in sunny windows.

More difficult to grow in the house, coral gem (*Lotus bertheloti*) is a lovely plant from the Canary Islands. The tiny, feathery leaves are silver-gray, the beaked flowers scarlet, turning to orange. It needs the moist air of a greenhouse to grow well.

Begonias. Only a few begonias have a trailing habit. *Begonia scandens*, widely distributed throughout the West Indies and South America, is the most vigorous. The large glossy leaves are light green, the flowers white, but it is a shy bloomer in the house. *B. glaucophylla*, probably a seedling of *B. scandens*, has large, handsome leaves, gray-green in color. It rarely blooms in the house, but when and if it does, the flowers are coral-red. MARJORIE DAW (*B. coccinea* x *B. glaucophylla*) is a better bloomer. It has bright green leaves and large trusses of clear pink flowers. It was developed by Mrs. Theodosia B. Shepherd of California, sometime in the 1880's. The hanging basket begonias (*Begonia pendula* hybrids) deserve greater popularity. Members of the tuberous begonia group, they produce cascades of flowers in shades of rose, salmon, red, white, and yellow.

Rothschild

Star-of-Bethlehem
(*Campanula
isophylla alba*)





Rothschild

Flame-violet (*Episcia*)

Foliage Plants

The philodendrons are well known as vines that will endure hard conditions. A new variety, sold as *Philodendron micans*, has a dark green leaf, white-veined, with a velvety sheen, dark brown beneath. It is a rampant grower. *Scindapsus* (often called *Pothos*), too, is well known as a trailer. The handsomest one is *S. aureus*, from the Solomon Islands.

An old favorite, *Saxifraga sarmentosa*, has round gray-green leaves, silver-veined, red beneath. Long red runners bear small plants at the ends, and this probably accounts for two of its many common names—strawberry-geranium and strawberry-begonia, although it is no kin to any of these plants. In Maine it is called Otaheite, and perhaps Maine sailors brought it home from that faraway island, for it is a native of the Orient.

There are many, many kinds of English ivy (*Hedera helix*) and they do well in north windows, without sun, as well as in sunny locations.

The spiderworts (*Tradescantia*) are legion, and well known. One of the

newer kinds is *T. blossfeldiana*. The dark green leaves, smooth on top, are deep purple with white hairs beneath, and are borne on hairy purple stems. The flowers are bright lavender. *Setcreasea* is a new genus, allied to the spiderworts. Two species are available. *S. pallida* has pale lavender flowers and gray leaves delicately veined with lavender. If grown in full sun, the whole leaf will flush deep purple. *S. striata* has light green leaves, strongly veined with white. The underside is purple, veined with green. The leaves are velvety in texture and the flowers white. These plants were discovered in Mexico by Mr. Thomas MacDougal.

The creeping fig (*Ficus pumila*) will endure hot rooms. The small green leaves keep their color and texture in a temperature of 80° F.

Wire vine (*Muehlenbeckia complexa*) is well named. The stems are brown and very wiry, bearing tiny green leaves. The minute green flowers are inconspicuous, but the fruits, in the leaf axils, are glistening white, like bits of ice. It is a rampant grower and will thrive in any window.

The ceropegias are small-leaved vines, delicate and pretty, but not showy. *Ceropegia woodii* is the best known and most easily obtained. The long trailing stems are set with pairs of small heart-shaped leaves, marked with white. The pinkish-purple flowers, which are borne in the axils of the leaves, are miniature Dutchman's pipes. Small gray tubers give the plant its common name of rosary vine, and from these tubers new plants may be propagated. *C. barklyi* has larger, thicker leaves, more conspicuously veined with white. *C. debilis* has long, narrow leaves and similar flowers. I remember seeing a row of these vines in 2½-inch pots, set on the half-sash of a sun porch. They made a very decorative delicate green curtain.

If one likes grasses, there are two which are easily grown and very pretty. St. Augustine's grass (*Stenotaphrum secundatum variegatum*) is a rampant grower in any window. The long, slender green leaves have a wide white stripe

through the center. A smaller grass, less than half the size of *Stenotaphrum*, is *Oplismenus hirtellus*, from the West Indies. The white stripes in its leaves turn pink in a sunny window. The flower is a typical grass flower, light and feathery in appearance.

Ferns will thrive in a north window, without sun. *Davallia bullata* is the kind used by florists in making "fern balls". The leaves are from 6 to 10 inches long, dark green, very firm in texture. *D. canariensis* has larger leaves, lighter green, more open form. These two are known interchangeably as deers-foot, rabbits-foot, or squirrels-foot fern. *D. fejeensis plumosa* is not as often seen, either in homes or greenhouses, but is the handsomest of the three kinds, and just as easily grown. Occasionally, during the winter, plunge these ferns into a deep pail of tepid water, and drain well before returning to the window.

Newer Kinds

The beauty and grace of these plants in the house have set plant lovers hunting for still others with trailing habit. Some brave souls have tried, with more or less success, to grow *Columnna gloriosa* in the house. It can be done, but it is not easy. It is a native of Costa Rica, the long stems set with velvety-brown leaves in pairs, their undersides red. The tubular flowers are scarlet and last nearly two weeks. Since the plant is epiphytic* by nature, it should not be planted in ordinary potting soil. It does well in a mixture of one part leaf mold, one part sand, and six parts osmunda fiber. A northeast window suits it best. It needs moist air and careful watering.

At present the **flame-violets** (*Episcia*) are prime favorites. Their common name, like that of the popular African violet (*Saintpaulia*), is misleading. Probably the shape of the flowers suggested the

*Epiphytic—a botanical term applied to plants which grow perched on other plants. They are not parasitic on the supporting plants.



John Fanning, Dublin Botanic Garden
Begonia pendula hybrid

names, but neither of these plants is related to the true violets. The flame-violets are natives of tropical America and therefore thrive in heat and high humidity, but not sun, since they grow in deep forests where only filtered sunlight penetrates. Because they have been so recently introduced, the names are uncertain and confused. *Episcia fulgida*, also called *E. coccinea*, is one of the best known. The leaves are thick and plush-like, brownish, veined with silver-green. The flowers are scarlet, freely produced. *E. splendens* has smooth leaves, silver in the center, with green edges and green blotches between the veins. Its flowers are scarlet, also. There is a yellow-flowered variety from Peru. *E. lilacina* from Costa Rica has bronze leaves and blue flowers. These are very scarce at present while still other varieties, not yet properly identified, are not available at all.

These new plants are exciting, but whether these or some of the old time-tested favorites are chosen, every grower of house plants should try at least a few hanging plants.



Roche

(*Narcissus
tazetta*)

FORCING BULBS FOR WINTER WINDOWS

*Kinds to use and how to grow them to provide
a succession of bright out-of-season flowers*

Marian C. Walker

The forcing of both hardy and semi-hardy bulbs to add bright colors among house plants can be regulated with remarkable precision. Freshly bought bulbs, in varieties especially prepared for forcing, will bloom very closely to a known schedule. Many others not so prepared are equally suitable and can be brought into bloom earlier than their normal time outdoors.

Forcing simply means hurrying the bloom by bringing planted bulbs, well rooted, into a warm temperature. The florist-grower adheres rather closely to the dates when he can safely begin this forcing, because he can take no chances with the well-shaped flowers, long stems, and good foliage needed for his trade. The intrepid amateur, however, can afford to try out dates somewhat ahead of suggested schedules.

It is in experimenting with these earlier dates, in attempting to force bulbs that would not be interesting to a commercial grower, in selecting certain varieties which will bloom when most needed in winter windows, and in choosing colors to harmonize with room decoration—that the amateur experiences both exhilaration and satisfaction.

A program of bulb forcing is more elastic when both earth-grown and water-grown bulbs are planted.

Growing in Water

Growing in water is suggested for only certain bulbs. All their growth is made indoors, and therefore winter temperatures need not be considered. Frequent plantings, then, can be made over a long time. Also, bulbs grown in water are easily examined for root development, and can be either held back or brought along as soon as they are ready.

To enable water-grown material to develop a good root system, a cool dark root-cellar is ideal, or bulkhead steps where the pots can be kept raised from the floor. The container can be selected with a room color scheme in mind. It should be deep enough to allow the roots to spread. It is filled with sand, peat, or pebbles. Many growers prefer a thin layer of sand on the bottom, with the

spaces between the bulbs filled with small pebbles. Later, as the roots grow, the bulbs heave upward, and must be anchored with heavier pebbles. The water is maintained at such a level as to just touch the bulb keel.

Growing in Earth

When bulbs are potted in earth they can be placed for root development in a very cool to cold dark cellar where there is good air circulation near the floor so as to avoid mold; or they can be sunk in a cold frame and the glass lifted for necessary watering; or they can be buried outdoors in a pit or trench which is filled in with earth and covered with salt hay. This layer of hay and earth does not freeze and is easily lifted when pots are ready for bringing indoors. No watering of pots in a trench is necessary, unless the winter is exceptionally dry. Whichever method is used, each pot is marked with its varietal name and with the date on which it is to be brought in for forcing.

The establishing of a good root system is necessary for success. This means early potting of all material which is wanted early. If pre-cooled bulbs are being used—and it is difficult to buy these except in large quantities—they are potted immediately to avoid heating. For the amateur,

Roche

Planting narcissus bulbs for growing in pebbles and water



as a rule, potting should not be delayed beyond the end of October.

Hyacinths (*Hyacinthus*) are somewhat capricious. For extra early flowering they are trenched very deeply; for late flowering they are held over spread on a tray, at about 55° F., and planted at the end of November. Certain varieties of tulips (*Tulipa*) will either force early or can be planted for later flowering.

A good potting mixture is $\frac{1}{3}$ each of rich garden soil, humus, and sand, with no fertilizer.

Bulbs grown in earth are planted with neck and part of shoulder protruding, very closely placed, but not touching. A 3-inch layer of clean sand is thrown over them before they are covered with soil. If planted early, their roots should be well enough established to bring indoors at the dates here given for forcing the bloom. Daffodils (*Narcissus pseudonarcissus*), however, should be examined by pushing aside the new leaf growth to see if the flower bud shows well out of the neck. If not, hold out a little longer, as otherwise the flower stalk will be short. Crocus pips should show about 1½ inches before they are ready to shift indoors.

Kinds Suitable for Water Growth

All small and medium-sized hardy Dutch hyacinths (*Hyacinthus orientalis*); the tender French-Roman hyacinths (*H. orientalis albulus*) with graceful open flower sprays; and two hyacinth varieties grown by specialty growers and listed sometimes as "cynthella," are fine to grow in water. The two unusual ones are the small, pink ROSALIE, which will bloom by Christmas, and BORAH, a multiflora type with probably some French-Roman blood. It is a beautiful blue color, and a heavy bloomer, flowering by the middle of January. Medium-sized single hyacinths do well in special hyacinth glasses.

Autumn-crocus (*Colchicum*), if planted in late September in pebbles and water, will bloom in a month and hold its dainty, various-colored flowers for about three weeks. Paper-white narcissus (*Narcissus tazetta*) is familiar to all window garden-

ers. Except for the very early plantings they can be brought close to the window, and continued plantings will accelerate their time of bloom as the season advances. Prepared lilies-of-the-valley (*Convallaria majalis*), if in good condition, can be counted on in the same way for repeated plantings. A clump of healthy lilies-of-the-valley dug from out-of-doors can also be forced if kept in the dark, watered occasionally, and then brought to warmth and light. Bloom appears about February. These can be replanted out-doors in the spring. All other water-grown bulbs are discarded because they have not stored up food reserves for another year.

Kinds Suitable for Earth

Tulips, daffodils, all hardy and semi-hardy hyacinths, crocus, and grape-hyacinths (*Muscari*) can be forced in soil to give a wide range of winter bloom. After the root system is established (this can be determined by gently removing the the pot) they are brought into a cool, light, but not sunny place. This may be a cellar or a north room. When the leaf growth is well up and of good color, they can be brought to a medium-warm window. Direct sunlight is not desirable, but rather an east or northeast exposure. Hyacinths, if the flower stalk is not showing, should be kept covered. Crocuses force best at a temperature of 60° F. In the bud and flower stage, all these bulbs need almost daily watering, especially if the soil is light and well drained. Grape-hyacinths, while not showy in themselves, will be attractive if handled in small pots and combined with ferns or ivies.

After bloom, these earth-grown bulbs are dried off gradually in their pots. In the autumn they are planted outside in a fertilized soil, and will establish themselves there. They cannot be forced again.

By using the methods outlined it is quite possible to have a continuous display of bloom from forced bulbs from November until spring, and this without counting on the well-known paper-white narcissus which are both beautiful and useful.



Potting tulip
bulbs

Roche photos

Covering tulip
bulbs





After planting, pots of bulbs may be stored in a trench and covered over with earth. Inverted pots protect developing shoots.

Roche photos

Pot of bulbs may also be stored in a box or cold frame and covered over with earth.



After burying in trench or box, a layer of hay is added for protection against freezing. Labels permit ready identification when bulbs are removed for forcing.



Roche photos



Taking sprouted bulbs from cold-frame for forcing indoors.

Suggested Dates for Earth-Grown Bulbs

Hyacinths	Start Forcing	Expect Bloom
ROSALIE—pink	November 25	December 15
LADY DERBY—pink	December 25	January 20
GERTRUDE—pink	January 1	January 25
INNOCENCE—white	December 25	January 20
YELLOW HAMMER—yellow	December 30	January 25
GRAND MAITRE—blue	January 5	January 30
CITY OF HAARLEM—yellow	January 15	February 10
Tulips—Single Early		
DE WET—orange	December 30	January 25
COULEUR DE CARDINAL—red	January 15	February 15
RISING SUN—yellow	January 15	January 30
PINK BEAUTY—rose and white	February 15	March 10
Tulips—Mendel and Triumph		
DEMETER—early—violet	December 25	January 25
HER GRACE—early—pink	December 25	January 17
WHITE SAIL—early—white	January 5	January 25
KANSAS—late—white	February 10	March 8
TELESCOPIUM—lavender pink (grow away from direct light)	February 1 on	February 21
Tulips—Darwin		
WILLIAM PITT—red	January 1	February 10
PAUL RICHTER—red (easy)	January 5	February 1
PRINCES ELIZABETH—rose	January 10	February 15
THE BISHOP—late—violet	January 28	February 25
Daffodils		
GOLDEN HARVEST—giant trumpet	January 2	January 28
KING ALFRED—trumpet—yellow	January 10	February 10
HELIOS—yellow Koster (easy)	January 15	February 15
LADY MOORE—white, orange-edged cup	January 15	February 15
LAURENS KOSTER—white, yellow cup	January 25	February 25
Crocuses —Separate colors look well	January 10	About 3 weeks
Grape-hyacinths		
EARLY GIANT—blue	January 10	February 10
ARMENIACUM—deep blue (large)	January 15	February 15

Hyacinths

Carl





Author photo

African violet PINK LADY

AFRICAN VIOLETS

How to grow and propagate them successfully

Alma Wright

Probably the most popular house plant we know today is the African violet (*Saintpaulia*). It is easy to grow, lovely to look at, and thrives under a variety of conditions in our contemporary over-heated houses.

Success in growing beautiful, flowering African violets the year around depends on the observation of a few simple rules, which if followed will bring window gardening pleasure throughout the year.

Propagation

New plants may be propagated at any time of the year by means of leaf cuttings, plant division, or seeds. The most common method is by leaf cuttings. Use a medium-sized leaf with a stem preferably about 1 inch long. Sound young leaves are best for this purpose, and they should be cut, not pinched, from the parent plant.

Cuttings may be rooted in several different ways. To root a leaf cutting in

water, cover the top of a water-filled drinking glass or other container with waxed paper and secure it with a rubber band. Cut a hole in the waxed paper and stick the leaf stem through the hole into the water. Place in a well-lighted window, but not in the sun. In a few weeks, small white roots will appear and the leaf is ready to be planted. Plant the rooted leaf stem just under the surface ($\frac{1}{8}$ -inch deep) in a mixture of $\frac{3}{4}$ peat moss and $\frac{1}{4}$ vermiculite or sharp sand. Both the vermiculite and peat moss should be soaked before being used and the sand should be sterilized. When the small plantlets appear, transplant them into sterilized soil.

If several leaves are to be rooted, you may prefer to use a small wooden flat or pan and plant the leaf cuttings directly in the growing medium without first rooting them in water. Care must be used in watering as the flat must not be allowed



Roche

Leaf cuttings of African violets in various stages of development

to dry out too much while the leaves are rooting.

Another successful method is to plant leaf cuttings in a covered container. Battery jars, aquariums, or fish bowls are suitable. If one of these containers is used, place a thin layer of pebbles or charcoal over the bottom of the container to provide artificial drainage, then fill it to a depth of about 3 inches with the growing medium of peat moss and vermiculite or sand. Insert the leaf stem in the growing medium, taking care not to plant it too deep. Cover the top of the container with glass or cellophane and place it in a well lighted window that does not have direct sunlight. Cuttings rooted this way will not require much water, but should not be allowed to get too dry.

(Editor's Note: The use of polyethylene plastic film as described by Lewis Lipp, *New Methods in Plant Propagation* in *ARNOLDIA*, September 25, 1953 and *PLANTS & GARDENS*, Winter, 1953-54, offers still another excellent method of rooting cuttings.)

Potting and Soil

When the young plants are about 2 inches high they are ready to be separated and planted into soil. If more than one

plantlet is produced from the leaf the little plants should be gently worked apart and each planted in a separate pot. A weak-appearing plant or one with a poor root system should be placed back into the rooting medium where it will develop a more complete root system and grow into a sturdy little plant before it is potted up.

Water

African violets do not have to be watered every day but a daily inspection of the condition of the soil is necessary. Keep the soil only slightly moist to the touch. They may be watered from either the top or the bottom of the pot; the only requirement is that the water be warm. Regular watering will produce a better bloom—saintpaulias do not do so well when the soil becomes hard and dry; nor do they thrive if too wet, swimming is not for them. Common sense in watering a plant is the best rule to follow.

Light

Probably the most important factor of all in producing good growth and bloom is proper lighting. African violets will

Cutting new African violet plantlets from leaf



Roche

grow well in any window where they get plenty of light . . . but not strong sunlight. Plants must be kept out of the direct rays of the sun, except in mid-winter, when the mild light of the December or January sun encourages growth and bloom.

Many African violet enthusiasts have turned to fluorescent lighting with marvelous success. Lights are placed about 12 to 15 inches above the plant table and are burned approximately 14 hours per day. Tests have proven that 40-watt daylight tubes are about right for best results.

Temperature and Humidity

African violets will not thrive in an atmosphere that is too dry, too hot, or too drafty. An ideal room temperature is from 65 to 75° F. with a relative humidity of from 50 to 60 per cent. If the air is too hot and dry the buds may drop off or the blossoms will fall off shortly after they open. At too low temperatures, plant growth slows down, flowering may stop, and the foliage will not be nice and flat, but will curve down around the edge of the pot.

Humidity may be increased at plant

level by grouping the pots close together, by placing them on moist pebbles in a shallow tray, or, in the case of a single plant in a clay pot, by setting the pot in a larger jardiniere. The jardiniere will hold moisture around the pot. To increase moisture in the whole room, pans of water may be placed on the radiators or other heating equipment.

Fertilizer

After plants begin to bud and bloom they should be fed with a complete soluble fertilizer about once a month. Do not over-feed; use as the manufacturer directs. If sheep or cow manure is preferred, apply it, in small amount, directly on the soil at the edge of the pot, or in liquid form when the plants are watered. Manure solution is highly praised by many of the experts. It is made by pouring boiling water over dehydrated manure. Let it stand several days, then dilute the concentrated solution until it is about the color of weak tea. Use for regular watering.

With these simple rules, anyone with a reasonably "green thumb" should succeed with African violets.

100 HOUSE PLANT PORTRAITS

A Guide to Successful Culture

People acquire house plants for a variety of reasons. But whatever the reason for their selection, successful culture depends upon choosing the right plant for the right place.

Important factors in house plant culture are water, light and temperature, and to a lesser extent, humidity. Soil watering and house temperature can be controlled but, except for supplemental artificial light, the uncertainties of sunshine in many situations make the problem of light a variable one.

The 100 house plants pictured here, and the cultural directions that accompany them, are arranged primarily on the basis of their light requirements for satisfac-

tory growth. The special categories at the end are for unusual situations.

Naturally, since plants are living things, the classification is not as rigid as it might seem; many of the plants could as well be listed under several of the headings.

The following general purpose soil may be used except where otherwise noted:

Potting Soil

- 4 parts soil
- 2 parts sand
- 2 parts leaf mold or peat moss
- 1 part dried cow manure
- ½ cup of bone meal to one pailful (2½ gallons) of the mixture.

22 OF THE TOUGHEST

These plants can be recommended for growing in the most difficult situations, or for growing under better circumstances by those whose green thumb talents are underdeveloped. Dust, gas, and neglect seem to be acceptable to this life-tenacious group of plants. Others with similar growth qualities are *agaves*, *Howea forsteriana*, *Polystichum adiantiforme*, *Zebrina pendula*.

Aglaonema modestum (Chinese evergreen)

Shade; can be grown for months in water only.

McFarland



Aspidistra elatior (cast iron plant)

Sun or shade; water freely.

McFarland





Rothschild

Chlorophytum capense (formerly *C. elatum*) (spider plant)
East or west window; keep moist.



Rothschild

Coleus
Many colors, brighter if given some sun; easy to root; guard against mealy bug.

Crassula arborescens (jade plant)
Sun; not much water required.

Rothschild



Dieffenbachia (dumbcane)
Needs some moisture; if too tall, top may be cut off and rooted in damp sand.

McFarland





Buhle

Dracaena fragrans

Water freely; watch for mealy bug; if too tall cut off top and root in damp sand.



Buhle

Ficus elastica (rubber plant)

Any exposure; wash or spray leaves occasionally; cuttings do not root readily.

Ficus lyrata (fiddle leaf fig)

Any exposure; wash leaves occasionally.

Helxine soleioli (babys tears)

Water from the bottom; good for terrarium.



Buhle



Buhle



Roche



Buhle

Impatiens sultani (touch-me-not,
snapweed)

Easy to root; flowers well only if
kept cool.

Neomarica gracilis (apostle
plant)

Sun; produces flowers better
if given a dry period; report-
ed to be gas tolerant.

Monstera deliciosa

Any exposure but avoid direct sun;
moist atmosphere desirable; spray
leaves if possible.

Nephtytis afzeli

Some shade; tolerant of gas.

Buhle



Roche





Rothschild

Pandanus veitchii (screw-pine)
Water occasionally with liquid fertilizer; gas tolerant.



McFarland

Peperomia obtusifolium
Moist atmosphere desirable, but will withstand neglect.

Philodendron oxycardium
(formerly *P. cordatum*)
Moist atmosphere desirable.

Roche



Sansevieria zeylanica
Grows under all conditions; avoid over-watering, especially in winter; tolerant of gas.

Buhle





Rothschild

Aglaonema oblongifolia curtisi

Some moisture in air desirable; if too tall, top can be cut and rooted in sand.



Roche

***Scindapsus aureus* (Solomon Islands ivy-arum)**

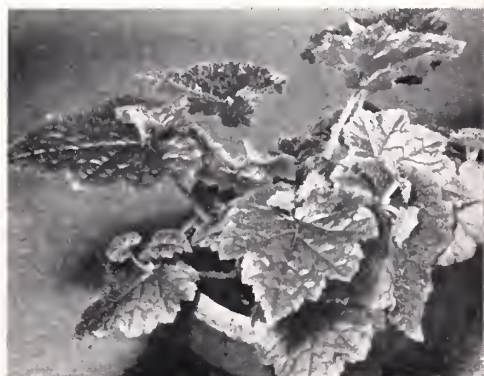
Slower-growing than philodendron; tolerant of gas.



Muller

***Tradescantia* (wandering jew)**

Very fast-growing; renewed easily from cuttings; tolerant of gas.



Buhle

***Tolmiea menziesii* (pick-a-back-plant)**

Easy to grow but watch for mealy bug; tolerant of gas.

8 OF THE NEXT TOUGHEST, TOLERANT OF REDUCED LIGHT

These are the north window plants in most house plant classification schemes, but many of them will do better with more light. African violets, for example, will grow and bloom vigorously if placed a short distance from even a south window. Other plants tolerant of inferior light conditions are those in the first group and begonias, bromeliads, ferns, *Saxifraga sarmentosa* and *selaginella*.

Asplenium nidus (birds-nest fern)

Shade; rich soil (see p. 247);
keep soil moist.

Buhle



Araucaria excelsa (Norfolk Island pine)

Light shade; keep cool (45°-50°F.)
in winter.

Rothschild





Rothschild

Fatshedera lizei

Good general purpose plant;
do not over-water; resistant
to mealy bugs.

Hedera helix (English ivy)

Keep moist and cool; wash
leaves fairly often; watch for
red spider and scale.



Buhle

Buhle



Nephrolepis exaltata* var. *bostoniensis (Boston fern)

Rich soil (see p. 247) ; avoid
direct sun.



Roche

Saintpaulia ionantha (African
violet)
See page 193.

Pteris cretica* var. *albo-lineata
Rich soil (see page 247);
moist air.

Buhle



Buhle

Syngonium podophyllum
Keep moist; spray leaves.

PLANTS THAT GROW BEST IN STRONG LIGHT

These plants thrive best in south windows, especially in winter. In summer, some may require thin shading from the direct rays of the sun. Many of them will grow almost as well in east or west windows, especially in bright, sunny climates. *Amaryllis*, *begonias* (in winter), bromeliads, most cacti, citrus plants, *Gardenia veitchi*, *iresine*, *Lantana camara*, and *Thunbergia alata* are among the plants not illustrated in this section which also respond well to plenty of light.



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Abutilon (flowering maple)
Prune in September to encourage winter flowering.

Beloperone guttata (shrimp plant)

Flowers in winter; can be started from cuttings of young shoots.



Roche



Rothschild

Cyanotis somaliensis (pussy ears)

Endures heat; keep a little dry in winter.



Roche

Euphorbia splendens (crown of thorns)

Sandy soil; keep rather dry during November and December, but water moderately at other times.



Rothschild

Ceropegia woodii (rosary vine, string of hearts)

Sandy soil; not much water.



Rothschild

Gynura aurantiaca (velvet plant)

Must be kept quite moist; not easy.



Buhle

Malpighia coccigera

Fairly tough; comparatively pest-free; propagate from cuttings.



McFarland

Pelargonium hortorum (zonal
or fish geranium)

See page 240.



Roche

Pelargonium peltatum (ivy-leaved
geranium)

Avoid dry air; keep cool in summer.



Muller

Veltheimia viridifolia

Flowers in winter; keep dry in summer, start watering when growth begins in fall.

THOSE REQUIRING MODERATE LIGHT

Generally speaking, these are the east and west window plants, which seem to do best if the light is neither too strong nor too weak. Are there exceptions in this classification? Yes, of course, but other things being equal, the plants illustrated here are intermediate in their light requirements. Other plants with similar light needs are *Astilbe japonica*, many begonias, bromeliads, *Epiphyllum* spp., *Eucharis grandiflora*, *Torenia fournieri*, many palms, Christmas cactus.



Buhle

Acorus gramineus variegatus
(variegated grass)

Sun or shade; keep quite wet.



Kuche

Aechmea (air pine)

Plant in osmunda fiber; keep roots on the dry side in winter, but keep water in the "vase" of leaves; tolerant of gas. Many other relatives of this plant make fine house plants (see page 179).



Buhle

Asparagus sprengeri

Plenty of water; feed liquid manure every 2 or 3 weeks when actively growing.



McFarland

Begonia semperflorens

Soil for begonias (see p. 178); keep moist but well drained.



Rothschild

Begonia foliosa

Soil for begonia (see p. 178); keep moist but well drained.



Buhle

Asparagus plumosus

Water freely; keep cool in winter if possible.



Roche

Caladium bicolor

Plenty of water when growing, quite dry in winter; same soil as ferns (see p. 247).



Roche

Cissus erosa

Keep constantly moist while actively growing; guard against mealy bug.



Genereaux

Cissus antarctica (kangaroo-vine)

Same as *C. erosa*, will also grow in poorly lighted places.



Buhle

Cyperus alternifolius (umbrella plant)

Grows in any soil, but must be kept wet.



Roche

Hoya carnososa (wax plant)

Use same soil as for ferns (p. 247); keep moist and warm during late winter and spring, dry and cool during fall and early winter; tolerant of gas.



McFarland

Dracaena godseffiana

Fairly tough; withstands neglect; smaller than other dracaenas, seldom more than 1 to 2 feet.

Maranta leuconeura* var. *kerchoveana
(prayer plant)

Use same soil as for ferns (see p. 247); spray leaves occasionally.



Roche

Pilea microphylla (artillery plant)

Keep moist; does well in terrariums.



Buhlo

PLANTS THAT "ASK" FOR HIGH HUMIDITY

As a group, these are the plants that are disease-free as well as having a high humidity requirement. Others in this general classification are the terrarium plants such as *Asparagus plumosus*, small begonias, croton, *Pilea microphylla*, and most ferns.



Buhle

Adiantum (maiden-hair fern)
Rich soil (see p. 247); does best in terrariums; not easy.



McFarland

Ardisia crenata (coral berry)
Keep moderately cool in winter (60°F.); tolerant of gas.



McFarland

Ficus pumila (climbing fig)
Tolerant of warmth or cold; water well, do not allow to become dry.

Ficus radicans var. **variegata** (variegated rooting fig)
Tolerant of warmth or cold; water well, do not allow to become dry.

Rothschild



McFarland



Calathea sanderiana (Sanders calathea)
East or west exposure; moderate water; fairly easy.



Buhle

Saxifraga sarmentosa (strawberry geranium)

Same soil as for ferns (see p. 247); moist.



Buhle

Selaginella uncinata (blue selaginella)

Rich soil (see p. 247); does well in terrarium; needs deep shade to bring out blue sheen.

Fittonia versaffelti (tall fittonia)

Shade; needs abundant soil water; does well in terrarium.

McFarland



Peperomia sandersi var. *argyreia* (a variety of Sanders peperomia)

East or west windows; does well in terrarium.

McFarland



PLANTS FOR COOL PLACES

The plants illustrated here grow most satisfactorily if both day and night temperatures are relatively low. At low temperatures, they can stand considerable light. Others in this general classification include *Araucaria excelsa*, *Camellia japonica*, *Campanula isophylla*.



McFarland



McFarland

Cyclamen persicum (florists cyclamen)

East window; keep moist; water from the bottom; rest during summer.

Capsicum frutescens var. **conoides** (tabasco redpepper)

Easy from seed; when in fruit keep in the sun; moist.



Roche

Episcia cupreata (flame-violet)
Small bulbs; start in vermiculite, then rich soil (see p. 247) in pots or hanging baskets; keep quite dry after flowering until new growth starts again.



Buhle

Primula malacoides (fairy primrose)
Best treated as an annual; sow seed from January to March for winter bloom, keep in shaded cold frame, bring indoors before frost; keep very cool.

Senecio cruentus (cineraria)
Seeds sown in May for winter bloom, in August or September for spring bloom.
Not easy.

McFarland



Solanum pseudo-capsicum (Jerusalem cherry)
Sunny window in winter, but keep very cool; give plenty of water; very sensitive to gas.

McFarland



FOR HOT AND DRY CONDITIONS

Many homes and apartments, human frailties being what they are, are kept both hot and dry. For such circumstances, the plants of the desert are best. They will stand from moderate to intense light, and it makes little difference if they are overlooked for a week or two by the watering can. So far as water is concerned, they are camels of the plant world. The ones given here are but a few of the large number in this category.



McFarland

Aeonium
Sun; sandy soil.



McFarland

Aloe variegata (Kanniedood
aloe)
Sun; sandy soil.



Buhle

**Cryptanthus zonatus var.
zebrinus**

Sun or shade; pot in osmun-
da fiber or very well-drained
soil.



McFarland

Echeveria

Sun; sandy soil; moderate water in
summer, very little in winter.

Kalanchoe blossfeldiana

Sun; keep moist but do not
over-water; after flowering
keep on dry side for 2
months.

McFarland



Kalanchoe daigremontana

Sun; keep moist but do not over-
water; propagated from small plants
produced on the margins of the
leaves.

Rothschild





Buhle

Gasteria hybrida

Sun; sandy soil; give rest in winter
(see pp. 237 and 238).



Buhle

Haworthia

Sun; sandy soil; give rest in
winter (see pp. 237 and
238).

Kalanchoe pinnata (air plant)

Sun; keep moist but do not over-
water.

Rothschild



Kalanchoe tomentosa

Sun; keep moist but do not
over-water.

McFarland





Branstetter

Mammillaria microcarpa (fish-hook mammillaria)
See page 232.



Branstetter

Notocactus leninghausi
See page 232.

Sempervivum (house leek)
Sandy soil; sun; little water
but not too dry.



Buhle

Stapelia grandiflora (a species of carrion flower)
Sun; sandy soil.



Buhle

FOR SEASONAL BLOOM

The plants pictured in this group bloom, for the most part, only during a particular time of the year. Culture conditions vary, therefore, depending upon the stage of bloom and rest period requirements.



Roche

Agapanthus

Allow to become pot-bound; water enough in winter to keep leaves from wilting. Bring into light in spring; increase water and give liquid manure.



Roche

Anthurium

Rich soil (see p. 247) or osmunda fiber; needs moist atmosphere and considerable light.



Roche

Amaryllis

Give very little water until bud shows; then water and give liquid manure during active growth.



Buhle

Begonia tuberhybrida

Usually planted out of doors, but do well in north window or on shady porch (see p. 231); summer bloomers.

Azalea

Rich soil (see p. 247). Put out-of-doors during summer; give sun, plenty of water and food. Bring indoors end of August or early September: keep cool as possible.

Roche



Begonia socotrana (Christmas begonia)

Begonia soil (see p. 178); keep cool; give plenty of light; water well but never allow to get soggy; propagated from leaves, but not easy.

Roche





Buhle

Camellia japonica

Rich soil (see p. 247); keep cool; give plenty of light; spray leaves occasionally with water; set pots outside in summer, in light shade; prune very little, immediately after flowering.



Roche

Clivia miniata (Kafir-lily)

Allow to become pot-bound; water enough in winter to keep leaves from wilting. Bring into light in spring, increase water and give liquid manure. Reported to be tolerant of gas.

Euphorbia pulcherrima (poinsettia)

Sunny window; moderate water; avoid dry air; sensitive to gas. For summer care see page 243.

McFarland



Fuchsia

Cool growing conditions; water well while actively growing, less water for 2 or 3 months after flowering.

Roche





Roche

Epiphyllum

East or west window; rich soil (see p. 247); plenty of water while actively growing, less in winter.



Roche

Gardenia

Rich soil (see p. 247); plenty of light but not hot sun; spray leaves regularly with water; not easy.

Sinningia speciosa (gloxinia)

See page 226.

McFarland



Lachenalia tricolor (Cape cowslip)

Sunny window; cool and dry until growth starts, then water.

McFarland



Zantedeschia elliottiana (golden calla)
 Rich soil (see p. 247) ; water sparingly until growth starts, then give great deal of water. When leaves die back, give less water for 2 or 3 months.



Roche

Oxalis rubra

Rich soil (see p. 247) ; little water and cool in winter, moist and sun in summer.



Roche

Zygocactus truncatus (Christmas cactus)

Plenty of sun and moisture when growing; give complete rest (no water) for 2 or 3 weeks in September, then resume watering.



Rothschild

GLOXINIAS

How to grow and propagate them

Albert and Trudy Buell

Awakening among the charms of spring, the gloxinia (*Sinningia*), house plant of unparalleled beauty, may without apology add her brilliant blossoms to complement Nature's outdoor loveliness. Such a color range as the hybrid gloxinia presents is a bit difficult to describe. All flower shades from delicate pinks to vivid reds are represented, as well as the darkest purples, the purest whites, and fine specklings on lightly tinted backgrounds. Throughout this gamut of color, the two types of gloxinia, bell-shaped and slipper-shaped, vie for admiration and attention.

The leaves of the gloxinia are both interesting and attractive. On some varieties they are extremely hairy, while on others they are nearly smooth. The size of the leaves varies a great deal, some measuring as much as 14 inches long and 10 inches wide.

Well developed plants of the larger kinds often have 40 flowers open at one time and one of our record plants has actually had as many as 102 blossoms showing at the same time. No other house plant offers such breathtaking reward for the effort spent in growing it.

Gloxinias are easily grown, and any flower enthusiast can achieve success in his efforts to produce gloxinias which have attractive foliage and admirable flowers. However, some skill is required to grow them well, and unlimited challenge is offered to the grower in the crossing of the different types and in waiting for the resulting seedlings to mature.

Soil

One of the first essentials is the preparation of the soil. We have found that gloxinias do best in a soil mixture that is rich and fibrous. A mixture of $\frac{1}{3}$ good garden loam, $\frac{1}{3}$ compost or leaf mold, and $\frac{1}{3}$ peat moss and sand in equal parts, has proven to be ideal for gloxinias. A 4-inch pot of bone meal is added to each bushel of this potting mixture, or a little less than a cupful to a 12-quart pail of soil mixture. Tubers that measure $1\frac{1}{2}$ inches across or less should be potted in 5-inch pots. Tubers that are larger in diameter should be placed in 6-, 7-, or 8-inch pots. Good drainage is insured by placing 1 inch of crushed charcoal in the bottom of the pot.

Light

Light is probably the most important factor to consider in raising gloxinias. One of the growers' chief problems and the question they most often ask is, why do some plants become "leggy" or "spindling"? Almost always, this unattractive condition is due to insufficient light. Strange as it may seem, some plants require more light than others. Thus a plant which tends to be spindling should be given the sunniest spot possible. Occasionally, we have had certain plants continue their "leggy" trend until the sun became higher and the days longer sometime in March. Generally speaking, most gloxinias do best in a south or east window where they can receive every possible bit of sunshine during the winter months. Sometimes in the summer a bit of shade is necessary.



Roche

Removing leaf of gloxinia to make leaf cutting



Roche

Inserting gloxinia leaf cuttings in vermiculite for rooting. Center pot is filled with water

Leaf Cuttings

If the grower desires to produce tubers which will flower the following year he should start leaf cuttings in the spring and summer. Once in a while a cutting that has been started in March or April will send up a shoot within six or eight weeks which will blossom during the same growing season.

We have found from experience that the leaf cutting should be taken as close as possible to the stem of the plant, where the leaf stem is hard. A leaf cutting having a hard stem will form a much better tuber than one having a soft, succulent stem.

Until quite recently, we used coarse sand for rooting our leaf cuttings. However, a mixture of half vermiculite and half native peat has more than proven its merit as a starting medium, not only for leaf cuttings but for gloxinia seed as well. In the house, especially in the dry atmosphere of a steam-heated home, a goldfish bowl or terrarium seems to be ideal for

leaf cuttings. These containers keep the air around the cuttings continuously moist—which is helpful in producing plants of excellent foliage and abundant blossoms. The leaf cuttings will also root satisfactorily in an ordinary clay pot.

When a tuber develops at the base of a cutting, it is ready to be potted. First

Roche



Stages in the rooting of gloxinia leaf cuttings. When tuber forms at base of stem, the cutting is ready for potting



Roche

Left, gloxinia seedlings in germinating pot; right, larger seedlings transplanted to another pot

it can be put into a 4-inch pot and later on into larger pots, if necessary.

Gloxinia leaves may also be rooted by slitting them across the veins and placing them on the rooting medium. A plant should form at each break in the leaf. Still another method is to cut the leaf in sections, splitting the main vein. In both of these methods there is a risk of losing the cutting through decay. Neither method is to be recommended for choice varieties until experimenting has been done with leaves of the more common types. No matter which method of leaf propagation is chosen, the leaves should be taken from the plants while they are still a good, healthy, green color, i.e., while the plants are still blooming. Mature or rested

tubers produce the greatest show of blossoms.

Water

Gloxinia plants should never be allowed to become water-logged. This is one of the foremost reasons for bud blasting or failure of the buds to develop fully. We advise applying water at the surface of the soil until it runs out of the bottom of the pot; in this way it can be determined how much water the plants have absorbed. They should not be watered again until the soil surface shows evidence of being dry.

Fertilizer

The amount of fertilizer required during the growing season will depend upon

Roche



Planting gloxinia tubers

the fertility of the loam and leafmold which were used in the potting mixture. We have found that liquid fertilizer applied once or twice during the summer is adequate. This is prepared from one of the complete commercial fertilizers.

Rest

Beginning in September or October, gloxinias should be given a short rest. We repot the tubers as soon as the foliage dies down and before storing them for their rest period. The potted tubers can be kept in a basement or other dark place until new growth appears. They should be watered only enough to prevent extreme withering.

The nature of the individual plant will largely determine the start of the new growing cycle. Some tubers require only a short rest, or dormant period, while others are very slow in starting. We have had, occasionally, a tuber send up new growth before the old top dies down and we have found that such growth will produce just as fine a plant as if the tuber had taken a 2-month rest before growing a new top. If no growth of a plant is apparent within 4 months, the amount of water should be gradually increased.

Plants which produce an early crop of blossoms in the spring can be cut off just above the first pair of leaves and thus be made to produce another good display of flowers within 10 to 16 weeks. However, this second flowering may delay the next year's flowering until summer. In preparation for its rest the mature plant should be given less water.

Raising from Seed

Growing gloxinias from seed presents a never-ending field of experiment and anticipation. There is no particular difficulty involved and beautiful flowering plants will develop within 5 to 10 months. Seed that is sown in July produces the best results in our area. Any of the accepted methods of germinating fine seed and handling small seedlings will prove satisfactory. We use the following method.



Roche

Cutting back gloxinia plant for new growth and flowering

The seed pot is filled with a mixture of vermiculite and native peat, which is loose and lightly packed down. In the center of this we place a much smaller pot, the drainage hole of which is corked. The small pot is kept full of water which slowly seeps through its sides, keeping the planting medium in the seed pot moist. Under dry conditions, extra watering may be necessary, especially if the seed comes up and the seedlings are weak.

The seed will germinate within 6 to 10 days. As soon as the seedlings are large enough to handle, i.e., when they measure approximately $\frac{3}{8}$ inch across the true leaves, they should be transplanted. As the plants develop it is of course necessary to repot them into larger pots. A night temperature of about 62 to 68° F. is desirable during the fall, winter, and spring months. Only fresh seed should be planted because its viability decreases greatly after it is a year old. Seed that is sown in July should produce flowering plants the following spring and summer. By the time they are ready for their resting period they should have tubers measuring from 2 to 3 inches in diameter. These tubers, planted in November, produce the largest specimens we have ever grown or seen, although smaller tubers started in the fall will produce excellent specimens.



One of the author's
magnificent hybrid
gloxinias

Roche

Pests

Thrips are the insects most likely to cause trouble. A rusty appearance of the leaf stems usually indicates their arrival. Their control is comparatively easy with DDT; its use every 6 or 8 weeks should eliminate the problem. DDT should be used with caution and as directed by the manufacturers.

Three other insects which may give considerable trouble to gloxinia enthusiasts are aphids, mealy bugs, and cyclamen mites. Aphids can cause a great deal of damage but they are easily controlled. The most effective spray for all types of aphids is nicotine sulphate. Mealy bugs will sometimes attack gloxinias although they prefer other plants. We have been

told that cyclamen mites can be stubborn pests although they have never been one of our problems; the new parathion sprays are reported to provide positive control.

There are many conjectures regarding the appearance of spots on gloxinia leaves and also leaves that suddenly die. Various things may cause these unsightly difficulties; some of the causes are unknown. The leaves of some strains of gloxinias turn black very easily and plants having buds that blast easily are also apt to be weak in this respect. If leaves of a plant that is in a warm, sunny window are splashed with cold water, they will often turn black. Also, if plants that are rather wilted are handled while in hot sun, their

leaves will often show the same damage. If the plants recover, the leaves will have burned-looking spots on them. Although sometimes only the leaf's surface tissues may be broken by sudden temperature changes, more often the injury penetrates the whole thickness of the leaf. This type of spot does not spread and quite often the color will come back to a leaf suffering but slight surface injury.

There is another type of leaf spot that is rather common and quite different from that just described. It is caused by a disease that spreads especially in cloudy weather when the humidity is high. When this condition exists, water on the leaves will spread the spores of the disease from one leaf to the next. Sufficient ventilation, so that moisture is not allowed to collect on the leaves, is the remedy for this kind of leaf spot. Also, any leaves that are in a dying condition, especially if they appear to have mold on them, should be removed and burned.

In our gloxinia breeding work we have not tried to produce plants which come

true to color from seed by pollinating flowers on the same gloxinia. Such a practice as this would result in decidedly inferior plants. Our chief goal has been rather to achieve an excellent assortment of colors on plants that are easy to grow. Consequently, after several years of careful selection and hybridization, most of our large-flowered gloxinia hybrids have blossoms measuring over 5 inches in diameter. Almost every color combination is afforded, with the possible exception of yellow—and some of the blossoms have throats that approach a near-yellow or cream color. Many of the blossoms are ruffled. Some flowers are exquisitely marked and delicately shaded, others are solid red or purple or have fused shadings and variations of color with contrasting borders. Still others are resplendent in spotless white, blending in beauty with those having varied colors for backgrounds.

There are gloxinias in the future for all who enjoy growing the less common plants.

TUBEROUS BEGONIA CULTURE

These beautiful and increasingly popular plants are especially useful because they do well in shade, even on the north sides of houses.

The soil should be well drained and rich in humus. The tubers may be planted in pots or put directly in the ground.

The plants should be lifted before frost and set in a flat until the foliage dies down. When dry, the stems will separate easily from the tubers—they should not

be forcibly broken away. The clean tubers are stored in peat moss or vermiculite in a cool but frostproof place.

In March or April the tubers are placed about 2 inches apart in flats of peat moss and sand, or vermiculite. They should be just covered by the planting medium, which is kept damp but not wet, and put in a warm place to sprout.

When the ground has warmed up they are planted outdoors.



A group of miniature cacti (*Mamillaria*)

Author photo

CACTI AS HOUSE PLANTS

Fascinating and beautiful, these plants give big returns for minimum effort

Marie S. Branstetter

WOULD you have house plants that are easy to propagate, grow, and flower? That tolerate fondling or neglect equally well? That may be left alone while you go vacationing without having neighbors or friends come in to water? If the answers to these questions are in the affirmative, then the plants you should have are cacti. In addition to these advantages, they present such a large and diversified selection that almost any taste may be satisfied. There are the grotesque and bizarre forms, those armored with heavy protective spines, in themselves forming colorful and interesting patterns, and for those who fear the spines, there are the softer, daintier species having no spines, or such soft and pliable ones that they can hardly be called spines at all.

Requirements

Before starting a collection it is well to do some planning as to the requirements of the plants and what you expect

of them in return. Perhaps the first consideration is the growing space available in one's home. Don't be dismayed if only a narrow window sill can be spared, as long as it affords light and sunshine at least a part of the day.

Sunlight. Remember these are sun-loving plants and southern exposures are best, though some of the more tender varieties may do better if lightly shaded from the strong afternoon sun. I house my collection in a southeast exposure and have found it to be ideal. I also have a number of plants that thrive and bloom in a southwest window.

Temperature and Water. In contrast to the hot sunshine, most of them can stand cold night temperatures (as low as 40° F.), so no pampering is necessary on that score. However, during the cold season it is better to water sparingly since cold and dampness combined are not good for cacti, and may result in plants rotting. During summer when

night temperatures are higher, they are more tolerant of water.

If in addition to the window sill there is space for a hanging basket, a shelf, or a bench, then greater numbers and varieties may be collected. If a sunroom is a part of the house, there is scarcely a limit to what may be grown. It is well to build a collection gradually, to insure oneself of being able to keep the plants clean and free of insects, and thus be able to enjoy them to the fullest extent. A few plants of any kind, well kept, are far better than a large number of poorly groomed ones. While cacti require the minimum of care and can go for long periods without any attention if circumstances call for it, when they become unkempt they no longer show off their natural beauty.

Soil. I like to repot cacti from any source in my own soil, making sure to use a very porous mixture. A good formula to use is 5 parts sand, 2 parts loam, 2 parts leaf mold and a little crushed charcoal. I also use glazed pots as I do for other house plants. They certainly add more charm to the home than ordinary clay pots.

Kinds and Varieties

The next consideration is kinds and varieties to select. My favorites are the **miniature cacti** which mature earlier and flower more freely than the large-growing varieties. Some never require more than a 1-inch pot, while many are happy in 2- or 3-inch pots. Eighteen or twenty moderately small plants grow comfortably from year to year on a glass shelf 6 x 36 inches, while thirty or more of the true miniatures may be kept in the same space. Plants may be selected from local sources, or catalogs and price lists may be obtained from commercial growers. It is well to make a study of names, descriptions, and care. Studying a good illustrated catalog is one of the best ways of getting well acquainted with cacti, and the many good books on the subject contain all the information one needs outside of actual growing experi-

ence. Many beginners prefer to start with plants having common names, but I believe one should at least be able to recognize the botanical name of the plant since many different common names may be applied to the same plant, with resulting confusion. Most dealers give both the botanical and common names in their catalogs, thus making them fine elementary reference books for the amateur.

Miniature cacti, or those of small growing habits, are many and varied. Some of them form whole colonies of small plants on one main root stock. To some growers this type is more interesting than the solitary forms. These miniatures may be found especially among the mamillarias, a species offering a most varied selection of plants suitable for the home. Some of the finest forms in this group are the feather-ball mamillaria (*M. plumosa*), the laee mamillaria (*M. elongata*), and *M. aureilana*, *M. herrerae*, *M. schiedeana*, *M. lenta*, *M. albicoma*, and *M. albilanata*, all of which are soft-spined varieties. Many are winter-blooming which makes them especially desirable. Particularly attractive are the so-called "hairy" or "woolly" mamillarias such as *M. bocasana*, *M. guelzowiana*, *M. longicoma*, and *M. bombycina*. However, these innocent-looking little plants are armed with central spines much like a fishhook and are often called "fishhook cactus." *Mamillaria multiceps* and *M. prolifera* are two of the easiest to grow and flower, both having dense white spines with yellow or brown central spines protruding and giving variation of color. At a very early age these plants start clustering and in time form small mounds of tiny heads on which are borne cream-colored flowers in late winter and spring, followed by bright red seed pods the next year.

The **Rebutias** are another ideal group of miniatures. The spines of these little fellows are really harmless bristles and the lovely flowers of red, pink, and yellow spring from the base of the plant instead of the crown as in the mamillarias. A solitary plant when full grown rarely exceeds 1½ inches in diameter, though

clustering forms will become larger. They are extremely easy to grow and flower at an early age.

The **ball cactus** (*Notocactus*) is easy to grow and has many forms as to spine texture and color. *Notocactus leninghausi*, a favorite of most fanciers, has lovely soft golden spines. It is slow growing but after a few years it brings forth off-sets and it is indeed difficult to find a more beautiful plant than a 4-inch specimen with the tiny golden youngsters clustering around its base. Another beauty is *N. scopia*, covered with soft white spines and with a central spine tipped red giving a striking touch of color. This makes a lovely companion plant for *N. leninghausi*. *N. haselbergi* is another white-spined variety and is a real beauty. Free-flowering varieties, more often seen in collections, are *N. ottonis*, and *N. apricus*. The buds spring from the crown of the plant, and look much like balls of felt until they open into clear yellow flowers, usually larger than the plant itself.

The **Tom Thumb cacti** (*Parodia*) are also dainty little plants. Some of these should be in every window garden, especially *Parodia mutabilis*. It appears to be covered with soft white spines, though the longer central spines of reddish brown give it much color and the spiral arrangement of the spines adds interest. In early May each year brown woolly buds appear in the crown of the plant and emerge into lovely orange-colored flowers in clusters of three to five. This plant rarely exceeds 2 inches in diameter and is therefore a perfect miniature.

The smallest of all the miniatures are the **fraileas**. These tiny plants are globular in form, growing both solitary and clustering, and have a peculiar habit of forming quantities of seed from flowers

which never open. When the capsules are ripe they simply pop open and re-seed themselves around the parent plant. Given ample room in a small dish they prove very interesting as several generations are soon growing together.

Larger cacti. While there are hundreds more of these small cacti, there are equally as many that grow larger and are just as attractive to those who prefer larger plants. Some of these are the *Echinocactus*, of which the golden barrel (*E. grusoni*) is perhaps one of the loveliest. It is named from the color of its long sharp spines. The *Astrophytum* has many forms. Star cactus (*A. ornatum*) has spines, while the sand dollar (*A. asterias*), and bishops cap (*A. myriostigma*), have no spines. Many varieties of *Cereus* grow into tall stately columns and are striking accent plants for the modern home. No plant is more beautiful than a specimen of old man cactus (*Cephalocereus senilis*) with its long snow-white hair. The golden old man (*Pilocereus chrysacanthus*) covered with golden spines and silky hair, is also striking. Silver torch (*Cleistocactus strausi*) makes a fine large specimen, while anyone having seen the flower of night-blooming cereus will never forget it. *Selenicereus pteranthus* is one of the best of the night bloomers. The orchid cacti (*Epiphyllum*) have been called "a cactophile's reward," and no better words could be applied to the blossoms of pink, red, white, violet and bicolors. These make perfect hanging basket plants and are among the showiest of the cactus family but require more care and richer soil than most.

In ending, I would like to say that any cactus one selects as a first house plant is the beginning of a never-ending adventure.

A group of mixed miniature cacti

Author photo





Author photo

Camp at Knersvlagte, Namaqualand, South Africa

SOUTH AFRICAN SUCCULENT PLANTS

A challenge in proper culture

Lionel E. Taylor

IT has been my good fortune to have been able to make five expeditions to South Africa during the past 19 years to collect plants. Prior to 1911 ten years were spent in the South African Forest Service. Travel always has been by motor caravans and has extended to nearly 50,000 miles. Collecting succulents has been my main hobby and the following notes are from observations in the field and from growing a fair number of the plants in a conservatory in British Columbia, under conditions very different from those of their natural habitats.

An increasing interest is being taken on this continent in the growing of succulents. Outside of favored localities in California and other southern states most of these plants have to be grown indoors because of adverse weather conditions, either too cold or too wet, or both.

Climate

The most important factor to consider in growing South African succulents is the climate, especially the rainfall. With the exception of a very narrow strip along the south coast of the Cape Province, the whole of South Africa has either winter

or summer rainfall which lasts roughly for 6 months. During the dry season practically no rain falls and the relative humidity is extremely low. The winter rainfall area extends from the desert coast of the Atlantic around the Cape of Good Hope and along the southern coast of the Indian Ocean to near Knysna, where there is an increased and more general rainfall which then tapers off towards East London to join the summer rainfall area. The winter rainfall area along the south coast is a very narrow strip only about 40 miles wide from Cape Town and only a few miles wide towards the east. The whole of the interior of South Africa has summer rainfall.

The precipitation in the desert country along the west coast, which is the home of an immense number of succulents, varies from $\frac{1}{3}$ inch to perhaps 2 or 3 inches per annum. It must be pointed out, however, that these are averages computed over a long period and many areas may not actually have any rain for several years and then perhaps may have an inch or more in a few hours. At a camp 15 miles south of the Orange River there was said



Conicosia has
large yellow
flowers

Author photos

to have been no rain for 9 years and then a record downpour of .92 inch. Even here sixteen species of plants were collected although thousands of plants had not survived this long drought.

Desert Flora

Quite the most remarkable feature of this desert flora is the extraordinary rapidity with which everything grows after rain and the shortness of the growing season, which lasts only 3 weeks. During this period the succulents divest themselves of their protective dry skins and can be seen starting to grow within 24 hours. They flower and fruit within a week, finally within 3 weeks again assuming their resting condition. The marvellous annuals go through the same short life, the seed germinating within 24 hours or so. The rapid growth of succulents in response to water is almost unbelievable but can be easily demonstrated if the plants are given a 6-month rest, being kept bone dry for this time, then watered. Nearly ever year I demonstrate this to interested friends, and to their amazement they see growth taking place within 24 to 48 hours.

It is useless to go to the desert of Namaqualand to see the wonderful display of flowers unless there has been a rain. In 1935 we were in Eastern Rhodesia keeping in touch with the meteorological

office in the hope that rain might be reported. At last word was received that a very good rain had fallen so we dashed off to Cape Town and then 500 miles north to Namaqualand, motoring over 2,000 miles. By the week that had elapsed after the rain the whole countryside was a blaze of flowers. From there we made our way into the then little known Richtersveld to near the Orange River, where incidentally the temperature was 108° F., an inferno even in winter and so hot that not one plant was found growing on the scorched hills. It was too hot, we were told, for even snakes or lizards. On the way up we had marked the place where some very fine composites were growing, intending on our return to collect seed. On the return journey, after experiencing the above-mentioned hot spell with its devastating hot wind, we returned to collect our seed. We found the place we had marked, but there was not a sign of the plants; they had dried up and blown away in the scorching wind. The whole area was the same—not a flower to be seen. Thus ended the 3-week period for which we had arrived a week late but stayed for 2 weeks to see the finest show of flowers on record.

Last winter the same trip was started but it was found that the little rain that had fallen had come too late. The flowers

Euphorbia virosa, one of the most poisonous plants known, is said to be used by Bushmen to poison their arrows



were very poor, and after our tent was blown down by a 70-mile-per-hour wind accompanied by a terrific dust storm which obscured the sides of the road, we beat a hasty retreat to Cape Town.

Other Habitats

It must be understood that what has been described is the desert and is not the only place where succulents grow. They are distributed all over South Africa and many grow where there is a good rainfall. A succulent euphorbia and a stapelia (*S. whitesloani*) were found at a forest station in the Northern Transvaal having a 5,000-foot elevation and an annual rainfall of 82 inches, with 120 inches the highest recorded. Even here, however, there is no rain for 6 months of the year. At another place in the Karroo where I lived for 5 months many years ago, there was only one cloud the "size of a man's hand" during the whole period.

Growing Succulents

It may be asked what all this has to do with growing succulents which seem to thrive well with constant watering and absence of a resting period. The answer is that with such treatment most succulents will change the nature of their growth and

become elongated, losing their characteristic dwarfness. Moreover, very few will flower. It is true that to a casual observer many succulents when dormant look dead and uninteresting, but to anyone familiar with their habits the transition from the

Pachypodium namaquanum, one of the most unusual of the larger South African succulents





Cheiridopsis

Author photo

resting period to growth under the stimulus of moisture is truly one of the marvels of Nature.

In conclusion it may be of some interest to relate my own experience in growing succulents. A large collection was made in 1935 in Namaqualand. They were dried and wrapped in newspaper, and after several months were brought to British Columbia on a 3-month sea voyage via Java, Singapore, and the Philippines, crossing the Equator three times. They were finally planted on a bench in a conservatory 12 to 15 months after having been dug in Namaqualand.

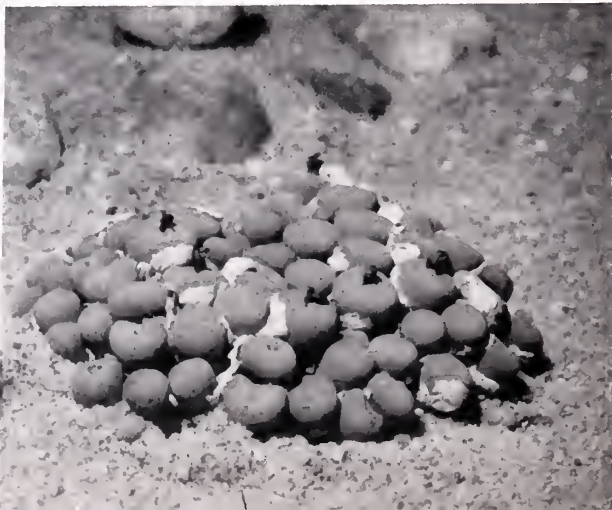
Strange to say most of them grew and are still growing after 19 years. The bench is 6 to 9 inches deep, filled with rocks, gravel, sand and very little soil. The plants are kept absolutely dry from the first of October to the first of April and during the summer are watered four to six times. They have withstood a temperature of 16° F. mostly without casualties and then only when they were touching the glass windows. Practically all have flowered every year. Most of them do not seem to be affected by reversal of their season in the northern hemisphere, although a few such as tortoise plant (*Testudinaria*) and some cotyledons come into leaf during the winter when they are rather emaciated. Later on, when watered, they regain their rotundity. Incidentally, my *Testudinaria* is a very large old specimen, and grows in a tub beneath the bench.

The easiest plants to grow are the haworthias, gasterias, aloes, cotyledons, and euphorbias. The mesembryanthemums are more difficult, especially the stone plants. The stapelias are easy but are apt to die at the roots after a few years. They are easily propagated by laying the shoots on the ground with a stone over them to hold them in contact with the soil; they will root very soon.

May I end with the Africaans salutation *tot-siens* (see you again).

Conophytum. Left, resting plant as it appears during dry season; right, actively growing plant during wet season

Buhle



BEGONIAS FROM THE WILD

CHILDREN of the tropics, no begonias are native to Europe or temperate North America. They grow in a broad band on each side of the equator, the world around, most of them in moist tropical forests. Some are found in the mountains, as high as 12,000 feet. Others, like *Begonia wadei*, in the Philippines, grow on the rocks where the ocean spray moistens them, while *B. socotrana* grows in the hot sand on the island of Socotra in the Red Sea.

Most of the early begonia collecting was done by men who went to foreign lands on business—doctors, sailors, administrators, and missionaries. The first record of plant exploring as a business is in 1777, when Hipolito Ruiz and José Pavon, botanists at the Royal Gardens of Madrid, were commissioned by the King of Spain to explore Peru and Chile. With them went Joseph Dombey, a French botanist, commissioned by the King of France to explore Peru, and granted permission by

the King of Spain to join the Spanish explorers. About twenty begonias were discovered by them, some of which had already been reported from other lands. Later, Ruiz and Pavon explored in Mexico where they discovered almost as many species as in South America.

As the next century opened, men of all nations began plant exploring in many lands, not exclusively for begonias, of course. Medicinal plants, spices, and above all, orchids, were desired.

When the discovery of new species began to slacken, the hybridists began to create new varieties. Hybrids of the fibrous group are best known today, and their name is legion. The tuberous-rooted begonias, so gorgeous in summer, are the offspring of seven tuberous species collected in Bolivia and Peru.

Even within the last ten years, new species of begonias have been discovered in the wild, particularly in Mexico.

BESSIE R. BUXTON

View in the coffee plantation zone of Mexico—a region where many begonias also grow. Both coffee and begonias like moisture, good drainage, and some shade

At the beginning of the dry season this dainty wild tuberous begonia forms drifts of pink flowers; it grows in a pine and oak forest at an altitude of about 6000 feet (Oaxaca, Mexico)

Courtesy T. MacDougall





Ooz

Young fancy-leaved geraniums

ZONAL GERANIUMS

*Some choice varieties of this popular plant
and how to grow them*

Holmes Miller

THE zonal geraniums* (*Pelargonium hortorum* of Bailey) have long been favorite window plants. Probably no other plant produces such showy flowers continually throughout the year. Geraniums are tolerant of the dry air and large fluctuations of temperature in heated houses. Insects and diseases are seldom

a problem indoors if the stock is clean when brought in. The zonal geraniums do require much light, and their use is limited to sunny windows.

Varieties

There are probably between 200 and 300 varieties of what might be called the ordinary sorts of zonal geraniums in the trade (although many of them are not at all ordinary). There are single, semi-double, and fully double-flowered forms of white, many shades of pink, orange, scarlet, red, crimson, and purple-crimson,

*Zonal geraniums (also called horseshoe or fish geraniums) are the "common" garden geraniums, derived largely from *Pelargonium zonale* and *P. inquinans*. The other garden geraniums are the ivy-leaved, the fancy or Lady Washington, and the scented-leaved.

some solid color, others with white centers or other variations. Habit of growth varies from compact and bushy to tall and rangy. The compact, bushy varieties are easiest to handle as window plants, and tend to flower most freely.

Many **mutations** have occurred in the zonal geraniums during the 240 years that they have been cultivated. Some of the more unusual mutations have been used to breed special groups, not well known except to collectors. Others have great value as window plants. Among these are the cactus-flowered, carnation-flowered, and rosebud types. Others have spotted petals (birds-nest geraniums) or truly variegated flowers.

The **fancy-leaved geraniums** are grown for foliage color rather than flowers, which are mostly poor. The development of this group took place in England, starting about 1850. By 1870 there were hundreds of varieties. They are attractive plants for sunny windows. The colors are brightest when the days are bright and sunny, with the nights cool.

Dwarf geraniums are especially good window plants. They are miniature zonal geraniums, some of them never getting more than a few inches high, and all of them small, very bushy plants that can be kept in 3-inch pots for years. Most of them are extremely free-flowering, with flowers surprisingly large in proportion to the sizes of the plants and leaves. There are also fancy-leaved varieties in this dark-leaved dwarf group. They are slow and a little difficult to grow, and should be regarded as collectors' plants.

Semi-dwarf geraniums. There are varieties that may be called semi-dwarf. These have the same bushy habit as the dwarfs, but are somewhat larger and sturdier.

Culture

The soil for geraniums should be neutral or slightly acid (pH 5.5 to pH 7.5). The best soil for potting is clay loam with enough coarse sand added to it that water runs through quickly, and yet not so much that the soil is too light for firm potting, which promotes compact growth and good flowering.

Pots for window use should be rather small, rarely larger than the 4-inch size. Good plants can be grown for months in 3-inch pots. Potbound plants flower most freely. Therefore, plants should be managed so they come into the winter potbound, since winter flowers are most desired and hardest to get because of the poor light.

Water. Geraniums should be watered liberally. A common error is to allow them to get too dry between waterings. They should never be allowed to become really dry. This is especially important with the dwarf geraniums.

Geraniums in pots need **fertilizing**. Small amounts of fertilizer are best, repeated as often as necessary. Watering the plants with a solution of a complete, soluble fertilizer is a convenient method of feeding. A fertilizer containing about 14 per cent nitrogen should be used at the rate of $\frac{1}{4}$ teaspoonful to a quart of water.

Given a sunny window and reasonable care as described, zonal geraniums will provide brilliant color during the winter months.

Geranium flowers—many types

Cor





Cox

Dwarf geraniums

Dwarf Zonal Geraniums

PIGMY	bushy, very dwarf, with small light green leaves and double red flowers
BLACK VESUVIUS	very dwarf, blackish-green to black leaves, large single scarlet flowers
IMP	}
BROOKS BARNES	
PIXIE	
CAPELLA {	}
RUFFLES }	
WHITECAP	double salmon flowers, dark leaves
PERKY	single white flowers, dark leaves
SPRITE	single red flowers with white centers, dark leaves
FAIRYLAND	gray-green leaves, ivory-white border, salmon-coral flowers
	leaves bordered ivory or pink and heavily zoned rose-red

Semi-Dwarf Zonal Geraniums

TWINKLE	dark leaves, double rose-coral flowers
MISCHIEF	dark leaves, double scarlet cactus-type flowers
EMMA HOSSLER {	}
MR. EVERAARTS }	
	green leaves, double flowers

CARE OF POINSETTIAS



Roche photos

Poinsettia (*Euphorbia pulcherrima*) usually comes into the home at Christmas time. With proper care it can be carried over from year to year.

When the leaves fall and flowers fade, gradually reduce watering until soil is completely dry; store dry at a temperature of about 60°F.



In spring, cut the plant back to about 6 inches and set the pot in the ground. If desired, the plant may be repotted at this time. Water moderately.

When the new branches are 5 to 6 inches long, cuttings may be taken. If the old plant has not already been repotted, this should be done.





Roche

*Epidendrum tam-
pense*

ORCHIDS AS HOUSE PLANTS

Kinds to grow and the factors which must be provided to make them succeed

Carl L. Withner

“ORCHIDS are easy to grow.” “If you can grow African violets, orchids will grow for you too.” As one may imagine, these statements cannot be taken too literally, especially if one does not live in Florida or California. But if the basic needs of orchid plants are understood, they can be grown as house plants, just as successfully as can other tropical plants. This hobby provides fine sport, as people have hardly begun to explore the great range of possibilities which orchids can offer in color, variety, and form.

The basic know-how for successful culture, in addition to selecting the right varieties for the house, includes an elementary working knowledge of the fol-

lowing factors: temperature, light, moisture, air, and nutrients. As a matter of fact, these factors are equally important in the culture of many plants.

Temperature

At the beginning choose “intermediate” orchids, those that grow with a day temperature of 70 to 75° F. and a night temperature of 60 to 65°. This corresponds roughly to the temperature in many homes. The difference between night and day is important to keep in mind.

Light

Most orchids grow in the wild perched on the branches of trees, high in the

*Oncidium ampli-
atum*



Buhle

jungles; others grow in the ground below, as do the pink moccasin flower (*Cypripedium acaule*) and showy orchis (*Orchis spectabilis*). Those from the tree tops thrive on lots of light, but light, broken up and diffused, as it would be after coming through leaves. A net curtain can be used in the home if the light is too strong. Plants like morning light better than the hot afternoon sun. You can gauge the proper amount of light by watching the plant. Too little light causes floppy long stems and dark green soft leaves. Too much light causes the leaves to bleach out to a yellow color and shrivel. Light green leaves, plump firm stems, and production of flowers indicate correct lighting.

Moisture

One must distinguish between the water put on the roots and the humidity in the air about the plant. Humidity is the most difficult factor to regulate properly in the home—usually it is too low. For most orchids it must be relatively high, yet at the same time not cause the plant to rot because of inadequate ventilation. This requirement leads to all sorts of moisture-controlling devices—glass cases, trays of gravel below the plants, or plastic shields around the plants. As far as the roots are concerned, water them well whenever they are dry. Leaves may be syringed daily to help keep them clean



Cypripedium hybrid

Buhle

and to provide humidity by evaporation, but they must be dry at night.

Air Flow

Most orchids like abundant circulation of air (simulating tree-top conditions), but it must be neither cold and drafty nor hot and dry. In short, ventilation should be gentle, and the air moist.

Potting

Some orchids such as *Cypripedium* and *Calanthe* may be planted in light soil mixtures of fibrous loam, sand and leaf mold, but most are planted in fern root fiber—from the fern called *Osmunda*. The operation of potting in this medium is very important. The pot is filled to about one third of its depth with bits of broken pot. The plant is held in the pot in such a position that the oldest part is at one edge, the younger parts toward the center, so there is room for extension of the growing tip. Damp *osmunda* fiber, cut into chunks the size of one's fist or a little smaller, is packed under and around the roots with a potting stick. The pieces must not be too small, or they will tend to work under the plant and push it out of the pot. The strands of the fiber should extend up and down in the pot to facilitate drainage. Fiber is added at the edge of the pot and pressed toward the center with the stick. It is packed in until the plant can be picked up by its leaves without slipping out of the pot. Although packed tightly about the roots in the pots, the fiber still allows for ample drainage and aeration, which are essential for root health. Some orchid fans grow the plants in gravel instead of fiber, and then water them every few days with weak nutrient solutions. This does away with the potting problem, but may accentuate the problem of properly regulating humidity.

If these basic requirements are provided, blended in proper balance for good results, orchids may be grown as house plants. They are a challenge, and time and effort spent on orchids is well repaid by the final results—flowers.

The following "intermediate" orchids should be among the first to be tried as house plants:

Odontoglossum grande
Odontoglossum pulchellum
Cattleya bowringiana
 other *Cattleya* species
Epidendrum cochleatum
Epidendrum obrienianum

Laelia anceps
Dendrobium nobile
Cypripedium insigne
Cypripedium callosum
Coclogyne massangeana
Oncidium shacelatum

FERNS

*Simple in their demands, many will thrive in deep shade,
providing attractive foliage for sunless rooms*

Alys Sutcliffe

Every house, however gloomy and lacking sunlight, can have something green growing and it need not be the everlasting *Philodendron cordatum*, or devils-ivy, as I have heard it called. Ferns are the answer, and many varieties will grow and flourish with little or no direct sun.

Light and Moisture

Ferns do like some light, and also moisture in the atmosphere. The first can be provided by placing the plants on a window sill or near a window, and the second by using a metal tray about 2 inches deep that will hold water. A baking dish will serve as a tray for a few plants. Fill the tray with pebbles and water and stand the plants on the pebbles. Another way to keep moisture around ferns is to have a window-box filled with peat moss which is kept damp. Sink the pots into the peat moss. If a radiator is under the window a piece of asbestos should be placed over it, under the plant containers. Under these conditions and with daily spraying ferns should flourish.

Soil

All ferns like moisture but they also like well drained soil with plenty of broken crock in the bottom of each flower pot. A good mixture is 4 parts soil, 4 parts leaf mold or peat moss, 2 parts sand, and 2 parts dried manure, with $\frac{1}{2}$ cup of bone meal and about 2 cups of broken charcoal to each painful of the mixture.

Scale

Scale is about the only disease that affects ferns. The male insect is slender and white and the female is round and

brown. These scales should not be mistaken for the spores or seed cells of ferns, which form on the undersides of the fronds. Amateurs who are just beginning to grow ferns frequently make this error. A strong spraying with water once a week and the use of Black Leaf 40 about once a month, at the rate of 1 teaspoonful to 1 gallon of water with the addition of a tablespoonful of soap powder, should keep the plants clean and healthy.

List of Ferns

The ferns in this list were selected for their neat, compact habit and proven worth as house plants.

Asplenium bulbiferum—Mother fern

Davallia bullata mariesi—Squirrels-foot fern

Davallia fejeensis—Rabbits-foot fern

Davallia fejeensis plumosa

Nephrolepis duffi

Nephrolepis exaltata bostoniensis compacta—Boston fern (compact form)

Nephrolepis exaltata roosevelti plumosus

Nephrolepis exaltata elegantissima trevelian

Polystichum adiantiforme—Leather fern

Pteris semipinnata

Pteris serrulata

Pteris tremula—Table ferns

Pteris umbrosa

Pteris wilsoni

Pteris winsettii

Selaginellas will grow under the same conditions as ferns:

Selaginella caulescens

Selaginella denticulata

Selaginella emmeliana

Selaginella kraussiana var. *brownii*

Selaginella uncinata

HOUSE PLANT PESTS

How to prevent them and what to do if they appear

Ruth Marie Peters

PREVENTION is the first rule of pest control indoors just as in the garden. Starting out with clean vigorous house plants and following a careful watering and feeding program throughout the year is a big step toward keeping them in prime condition. But, this alone is not enough! Additional insurance against insect and disease infiltration requires a consistent sanitation and cleanliness routine as well.

General Precautions

A systematic program of keeping faded flowers and foliage picked is a wise one. Drop the debris in a paper bag as you make the daily round of your house plants and burn the bag immediately thereafter. This day-to-day check up will also make it easier to detect any pests before they can do much damage.

Plants should be kept clean by syringing the upper and under foliage surfaces at least once a week, preferably early in the day so they dry before nightfall. An alternate method is to dip the plant in sudsy water. Aluminum foil or a square of plastic placed over the soil and wrapped around the pot will keep earth from muddying the water during the dipping. The suds should be rinsed off with clear water and, if possible, the plant set out to dry in direct sunshine.

Some plants can be showered or rinsed off right under the tap. In fact, a forceful stream of cold water, made by holding the thumb over part of the spout, can be used to wash off red spider and aphids when they are discovered. A repetition will be necessary every few days as each

new crop comes along, until finally all are disposed of. Follow-up spraying with the proper insecticide will speed control.

While the plants are being washed, don't forget to scrub the pots. Fertilizer salts which encrust a pot rim will burn tender foliage that comes in contact with it. Stubborn spots can be scraped from the pot with an old knife or with steel wool. Remove green mold as it accumulates for it clogs up the porous walls of clay pots.

Any containers used for repotting plants should be scrupulously clean. A wise procedure is to boil them for 10 minutes before using to kill any insects or disease left by a former plant occupant. If pots are placed in cold water which is then brought to a boil, there is little danger of their cracking. Plastic containers cannot be boiled but may be washed in a disinfectant such as Lysol diluted in water according to package directions.

Since insects and disease can be carried in soil, the use of sterilized soil will forestall any pests making a subterranean entrance into the window garden. You can purchase this in packages; sometimes a local nursery will supply a pailful or bushel basketful; or you can bake your own in a 350° oven for at least 40 minutes.

Any newly acquired plant should be isolated for at least 2 weeks lest it develop disease or insects which might be carried to healthy plants. Likewise, any plant "suspect" in the established indoor garden should immediately be removed from its companions and given prompt treatment. After several weeks' isolation

and when it has once more been given a clean bill of health, it should be put in its place among the pest-free plants.

As a further precaution, wash hands thoroughly after touching diseased or insect-infested plants. One watering can for the healthy garden and another for hospitalized or suspected plants prevents contamination.

With such common-sense care the danger of pest attack diminishes. If some invaders do slip through the barriers of your sanitation program, prompt recognition of pest or disease is of top importance. An accurate diagnosis is necessary so that correct treatment may be given.

Insects are much easier to detect than fungus diseases, which happily are not prevalent when house plants are given good care. An alert eye can easily see aphids, mealy bug, red spider, scale, and white fly, once it has learned to recognize them.

Cyclamen Mite

Since the African violet has become popular, cyclamen mite has become more prominent than ever before. It can infest begonias, ivy, geraniums and fuchsias, among the more common house plants, and can hardly be seen without the aid of a magnifying glass. The havoc it causes is a means of detection. Stunted, distorted leaves and flowers are symptoms; sometimes leaf edges are turned up in cup shape; and with African violets center growth becomes hard, stunted, and a sickly light color. Immediate burning of deformed leaves and a spray using Dimite at the rate of 1 teaspoon to a gallon of water, checks increase. The plant parts above the soil line can be submerged in hot water maintained at a temperature of 110° F. for -5 minutes. Sodium selenate* capsules have also been recommended for control. It is wise to destroy (rather than treat) infected plants unless they are valuable, and a cutting should never be taken from one of them for the new plant will certainly have mites.

*Poisonous compound—use only according to manufacturer's directions.



Roche photos

Washing begonia plants

Using an aerosol bomb; bomb should be held at least 18 inches from plant





Drawings by Eva Melady

Aphid

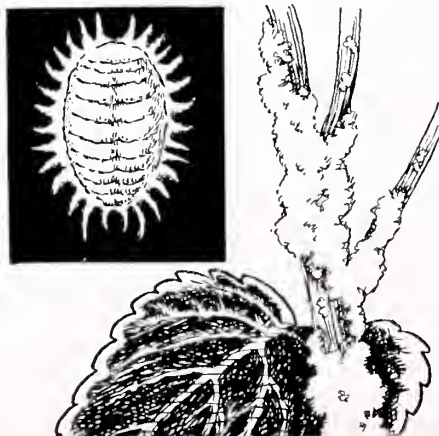
Aphid

Aphids are small green, gray, black, or red insects usually found clustered on new growth or buds or on the undersides of leaves. A spray gun filled with nicotine sulphate and soap, mixed as the manufacturer advises, should be used every few days until control is complete. I prefer to fill a basin with the solution and dip the entire plant in this, being careful to keep soil and pot intact by wrapping them with aluminum foil.

Mealy Bug

Small cottony fluffs appearing along leaf veins or at leaf axils where stems join the main branch show that mealy bug

Mealy bug



has moved in. An additional symptom is a sticky secretion which makes shiny patches on the leaves. Mealy bugs can be killed easily by touching each miniature "cotton boll" (an egg sack) with a toothpick which has been tipped with a piece of absorbent cotton and dipped in rubbing alcohol or toilet water. The same treatment routs the adult mealy bugs, which are tannish-white or grayish-white and of oval shape with numerous fringe-like filaments radiating in all directions. After a week the treatment should be repeated and this may be necessary three or four times before all disappear. Care



Red spider

should be taken to touch only the insect with alcohol, not the leaves.

Red Spider

Red spider is hard to see but its work is a distinct giveaway. Leaves take on a speckled gray-green or yellowish appearance. Sharp eyes will note a tiny web on the undersides or in the axils of leaves and a magnifying glass will disclose the mites crawling within their silken "parlors." Many can be washed down the drain with a forceful stream of water,

made by placing a thumb over part of the faucet. Also use a malathion spray or an aerosol house plant (not household) bomb. In using any spray bomb, be sure to hold it at least 18 inches from the plant.

Scale

The strong-stream-of-water routine will also discourage scale—the insect which lives under an armor like a flat turtle shell but has no means of locomotion. Scale, however, is not always oval like a turtleback, but may be hemispherical, pear-shaped or even threadlike. Only when young can these insects move about. Thereafter they are glued to the spot until you discover and do away with them, removing them one by one with a fingernail, or using the forceful-stream method or an insecticide such as malathion or an aerosol bomb. For tender plants that might be damaged by rough treatment, the insecticide spray is the best. Quite often, indoor gardeners mistake the spore cases of fern for some species of scale. However, fern spore cases are lined up in neat ranks, while scale, often more haphazard, will be found on stems as well as on the undersides of leaves.

White Fly

White flies are hardest to exterminate. Sometimes they are not noticed until a slight jar or bump makes them fly about. The young do not fly but are small pale cream specks on the undersurfaces of leaves. They also secrete a sticky substance. An aerosol bomb, DDT, or malathion will kill the adults but unfortunately the young are immune. For this reason, persistent spraying is necessary and any infested plant should certainly be isolated at once for it is an easy matter for winged insects to fly from one plant to another.

Fungus Diseases

Among fungus diseases, leaf-spot is the most common. It can be controlled by dusting with sulphur, covering both under and upper leaf surfaces with a fine dust film. Here again, cleanliness and sanitation can help in preventing leaf spot from appearing.



Scale

Leaf tips that turn brown are usually not caused by disease but are the result of too dry an atmosphere—a common condition in steam-heated homes. African violet leaf spot may be the result of accidental water drops cooler than room temperature or from wet leaves placed in the sun. Crown rot is invited by overwatering. When fungus diseases make inroads, a protective fungicide should be sprayed on all plants as a protective measure, even though they are apparently healthy. Fortunately, fungus diseases rarely appear on house plants that receive good care and proper sanitation. So it is the insect attack we must guard against with an immaculate grooming program, an alert eye, and an ever-ready spray gun.

White fly





Redwood burl
about five
weeks after
“planting”

Within The Brooklyn Botanic Garden

HOUSE PLANTS THAT ARE NOT HOUSE PLANTS —BONSAI THAT ARE NOT BONSAI

From California's Redwood Forests come redwood burls, strange knotty masses of wood that occur as outgrowths on the trunks and surface roots of the giant redwood trees. If kept moist by packing in damp sphagnum moss (or some equivalent material) from the time they are cut from the tree, they can be shipped great distances and kept alive.

Several Botanic Garden members, and people on the staff, are now growing and enjoying miniature redwood groves—from the culture of the burls.

To start bud growth on the burls, completely immerse them in water for about two hours, then place in a dish with from about $\frac{1}{8}$ to $\frac{1}{2}$ inch of water, depending upon their size. While the buds are starting to grow (for the first few weeks), keep the tops of the burls moist by sprinkling once or twice daily, as needed.

For best growth, give plenty of light but avoid direct sun. Although the burls rarely produce roots, with proper care they stay green and attractive for six months to two years (depending upon their size).

J. J. F.

Burls with young buds



Close-up of young buds



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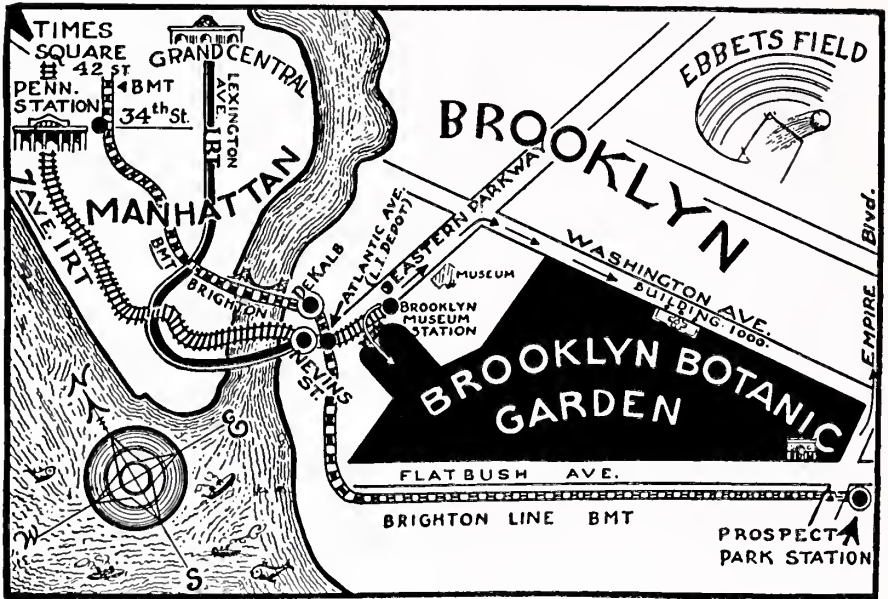
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Roses



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B.M.T. (Brighton Beach line) downtown express or local to Prospect Park Station.

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Union Street bus	} To Prospect Park Plaza
Vanderbilt Avenue bus	

By Automobile

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From Manhattan, take Manhattan Bridge, follow Flatbush Avenue Extension and Flatbush Avenue to Eastern Parkway; follow the Parkway to Washington Avenue, then turn right.

BROOKLYN BOTANIC GARDEN RECORD

PLANTS & GARDENS

WINTER
1954-55

The
Year's Highlights
in
Gardening
and
Horticulture

Journey to
Morocco

Our Garden
Heritage

Guide to
Recent
Nontechnical
Books and Articles
for Gardeners

NEW SERIES

Vol. 10

No. 4



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PLANTS & GARDENS

VOL. 10

Winter, 1954-55

No. 4

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Editorial

CONRAD B. LINK, PETER K. NELSON,
and the Editorial Committee of the Brooklyn Botanic Garden
Except where otherwise noted, drawings by Eva Melady

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Avery

The native home of Atlas cedars (*Cedrus atlantica*) is high above the Moroccan desert, within sight of snow-capped peaks (p. 281).

BROOKLYN BOTANIC GARDEN

1000 WASHINGTON AVENUE

BROOKLYN 25, NEW YORK

TELEPHONE: MAIN 2-4433

Winter 1954-55

In Review

With this issue of PLANTS & GARDENS, its first decade comes to a close. Swift have been the years that have brought some 3,000 pages of this unique quarterly to readers all over the world. And so great has been the interest in articles in the back issues that a complete index of volumes 1 to 8 has been prepared. It may be ordered on the convenient form stapled into this issue.

Continuing the custom of the preceding years, this 10th winter issue is a compilation of non-technical articles of lasting interest (or greater than average significance) that have appeared in gardening and horticultural magazines during the past year. The articles are condensed for quick perusal, and readers will note that our Editorial Committee has selected subjects chiefly on horticultural methods, some of them quite new. It is always a special pleasure to acknowledge the friendly cooperation of the publishers of the original articles -- and honors go to the authors.

Original Articles

The articles on "Morocco" and "Our Garden Heritage" have not been published previously.

COMING - 1955

	<u>Topic</u>	<u>Guest Editor</u>
Spring	Handbook of Plant Pests and Diseases	Cynthia Westcott
Summer	Roses	Richard Thomson
Autumn	Flower Arrangement	Marian Feddersen

Sincerely yours,



Director

Please Note:

Title page and contents of the 1954 volume will be sent to libraries for binding and will be available to individuals upon request.

Errors known to occur in this volume are corrected at the end of the index.

SAVE THIS DATE! TUESDAY, MAY 17th. ANNOUNCEMENT LATER.



Courtesy Philadelphia Inquirer

Flowers blooming in window boxes bring new atmosphere to narrow city street.

BEAUTY BLOOMS, BLOCK BY BLOCK

*How the suburbs' flowers appeared
suddenly in a city's back streets*

Kay Mott

Condensed from the Philadelphia Inquirer Magazine, October 24, 1954

ON MONDAY morning of May 25, the narrow confines of the 1700 block of Beechwood Street awoke to the drabness common to back streets of non-descript two-story houses in the neigh-

borhood. Not even a dandelion brightened its monotony. And where the row of houses ended, a dingy board fence contributed to its lack of charm.

By afternoon of May 25 the same block

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bloomed with flowering plants in thirty-seven window boxes on both sides of the street. The fence, its face lifted by white-wash, was adorned by hanging containers filled with plants.

A police car drew up. "Well," said its driver after surveying the floral additions, "it's too bad that by tomorrow this'll all be torn down and just a lot of litter for the street cleaners."

He couldn't have been more wrong.

Every box continued to overflow with blooms until frost. What's more, the same holds true of thirty-four blocks of the Neighborhood Garden Association, to which the Beechwood Street block belongs. The association's 2000 window boxes have not been molested.

"If anyone touched a plant he'd be in trouble," said one block leader. "Our members built the boxes and bought the dirt for them. Then, when suburban garden club members were nice enough to raise extra plants for us, do you think we wouldn't take care of them?"

A Neighborhood Project

The Neighborhood Garden Association was born last year mainly because those who live in drab blocks wished to improve the appearance of their homes, and because Mrs. James Bush-Brown, retired director of the School of Horticulture for Women at Ambler, Pennsylvania, thought of a way they could. And both the residents and Mrs. Bush-Brown were willing to work for it.

Here's how it works. A group of residents decides to improve the appearance of the block. It forms a block unit of the neighborhood association, enlists all the dwellers on the street. When practically all are signed up, the unit asks Mrs. Bush-Brown to find a sponsoring suburban garden association, whose members generally grow more flowers than they can use. The block unit makes its own window boxes and buys dirt to fill them. When the boxes are ready, the suburban garden club members bring in their extra plants, and show the town growers how to care for them.

The first year, 1953, seven blocks joined and planted 400 boxes. Soon other blocks asked to join. They were admitted as soon as they signed up enough members. This 100 per cent participation is the key to why the boxes have not been harmed.

The blocks hold weekly meetings in members' homes, and monthly ones of the blocks that belong to their club in a community center. They make their own by-laws and vote their own dues, which range from 35 cents per member a month to nothing.

Idea Spreads

One block leader wanted a rose bush. Association block has been planted, the blocks around are inspired and improve their own streets to match. Many blocks have gone beyond their original window box planting. Some have turned vacant lots which were unsightly dumps into gardens where they hold story hours for small children.

One block leader wanted a rose bush. After Mrs. Bush-Brown obtained one for her and showed her husband how to make a holder for it, the rest of the block bought roses, too. Another hung its window boxes on chains, so they could pull them into their houses this fall for indoor gardens. The largest of the clubs, with sixteen blocks and some 300 members, held a flower show in September. When Mrs. Bush-Brown and sponsoring garden club members aren't handy, a community center staff member acts as adviser.

One club was started by a talk Mrs. Bush-Brown gave at a school. She brought with her some geranium plants in flower, found that not one pupil could tell the name of the bloom. Now almost all of them know how to take a slip from an adult plant to root a new one, and use their knowledge to keep the boxes of their block in full bloom.

At one housing project the plantings are in the small front and back plots, formerly miniature dust bowls.

The back streets of many city areas are drab and ugly. The residents of one such neighborhood have dramatically shown that this need not be so.

IRON CHELATES

New life for iron-starved plants

William G. Mitchell

Condensed from *Popular Gardening*, July, 1954

IRON deficiency, which causes a chlorosis or yellowing of the leaves of plants, is found in many parts of the United States and the world.

For years horticulturists have tried to find a way of controlling iron chlorosis.

Now you can correct iron chlorosis in your garden or orchard by applying chemicals called iron chelates (kee'-lates) to the soil or by spraying the foliage with a solution containing chelated iron.

Symptoms of Iron Deficiency

You can easily tell if your plants are suffering from iron deficiency. In mild cases, the leaf veins are darker green than the areas between them. As the deficiency becomes more pronounced, the areas between the veins become increasingly lighter green, then yellow, and finally fade to an ivory color. Unless you supply iron to the plant it will die eventually.

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Buhle



Healthy leaves (*above*) and iron deficient (*below*); left to right: leaves of passion flower, gardenia, poinsettia

Citrus Trees

Two scientists of the Florida Agricultural Experiment Stations—Drs. Ivan Stewart and C. D. Leonard of the Citrus Station at Lake Alfred—were the first to discover that chelates could supply available iron to plants in the field. They found this was the only successful way to green up citrus trees affected with iron chlorosis.

Before using iron chelates, Drs. Stewart and Leonard had tried a number of ways of feeding iron to citrus trees. They had limed acid soils heavily, applied up to 25 pounds per tree of ferrous sulfate, used sulfur and aluminum sulfate with the iron sulfate, sprayed the leaves of the trees with ferrous sulfate, and had injected even solid ferrous citrate into the trunks of the trees. None of these experiments worked. The trees remained chlorotic.

But when they applied as little as 10 grams of chelated iron to the soil around each tree, the trees became green within 6 weeks. New flushes of growth invariably followed application of chelated iron around the chlorotic trees, and trees that received 20-gram applications in 1951 are still green.

Other Plants

Dr. Philip J. Westgate, of the Central Florida Experiment Station, has made several experiments to test iron chelates for vegetable crops and ornamentals. He applied Fe-K-EDTA (ferrie potassium ethylenediamine tetra acetate, an iron chelate) to the soil around chlorotic corn plants. The corn became green within one week, even though the soil contained a high concentration of copper which contributes to iron chlorosis. Chlorotic gladiolus plants treated with 5 grams of Fe-EDTA greened within a week also but those given as much as 25 grams were injured.

Other plants in Florida which have responded favorably to soil applications of iron chelates are Chinese cabbage, mustard greens, cucumbers, hibiscus, beans, okra, azaleas, hydrangeas, ixora, carnations, camellias, chrysanthemums, garde-

nias, ligustrum, roses, snapdragons, spinach, and grasses including St. Augustine, Centipede, Pangola, and Bermuda.

Foliar Spray

Dr. Westgate says that chelated iron will also cause iron-chlorotic plants to turn green when used as a foliar spray. However, as little as 0.5 per cent by weight of Fe-EDTA in a water solution produced severe burning on corn leaves even though it greened them. Dr. Jay Wright, of the Geigy Company at Orlando, Florida, has found that as little as 1 pound of Sequestrene NAF_e (an iron chelate produced by his company) in 100 gallons of water produced some burning of rose leaves, although he got good results with 15 pounds per acre added to the soil without burning the plants.

Soil Application

At present, soil applications seem to be the best way of using chelated iron to correct iron chlorosis.

For home garden use, a safe rate of application would be 1 ounce in 25 gallons of water per 100 square feet, or ¼ teaspoonful per gallon per square yard.

How Chelates Work

Iron chelates themselves are not new. EDTA is a chelating compound that is used widely in industry, but the Florida experiments were the first ones to use chelates to supply iron to plants in the field. Chelates were used in solution cultures in the greenhouse some time before they were used in the field.

The word chelate comes from the Greek word meaning claw. Chelates may be compared to two claws which catch and hold metal ions. Metal is then free to be taken and used by plants and does not combine with other elements to form insoluble compounds. In simple iron compounds, the iron often does this and so becomes unusable by plants. Because of this tendency of iron to form insoluble compounds, plants are often iron chlorotic even when there is plenty of iron in the soil for normal growth. It is this ability of chelates to hold metals, particularly



Chlorotic azalea plant before treatment with chelated iron



Geigy photos

Same plant, healthy green color restored, six weeks after chelates were applied

iron, in a form plants can use that gives chelates their importance.

Iron chelates are already being used extensively in citrus, commercial trucking, and flower-growing areas in Florida. Much of the vegetable land around Sanford, a rich vegetable-growing area, shows symptoms of iron chlorosis. This iron-de-

ficient land now produces good crops after being treated with iron chelates.

Iron chelates available now do not work as well in soils having a high pH as they do in more acid soils. At this time scientists are trying to find other chelated iron compounds that will work under alkaline soil conditions.

Gladiolus plants below were both treated for iron deficiency at the same time. Plant at left, sprayed with iron sulfate, did not improve; healthy plant at right resulted when chelated iron was applied to soil.

Westgate





GROWING RHODODENDRONS AND AZALEAS IN LIMESTONE AREAS

How to grow these favorite ornamentals in regions having non-acid soils, and "on top of the ground," at that

H. Gleason Mattoon

Condensed from Horticulture, June, 1954

With added illustrations

IF YOU were to travel to the Allegheny Plateau and investigate the root system of the finest and largest rhododendron within sight, the chances are that the fibrous roots will be clinging to the top of rocks with scarcely a half-inch mulch over them. *Rhododendron maxi-*

mum has shallow-matted roots, few of which, even on older specimens, are more than 3 inches below the surface.

In the Great Smokies, you might examine the maze of Catawba rhododendrons on the upper mountain reaches. Crowns 8 feet across and stems 2 to 3

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Light shade in open woods, ideal for rhododendrons

Buhle

inches in thickness are supported by a comparatively small root system, nearly all of it just under the surface of the soil.

Coming north along the Del-Mar-Va Peninsula, it is rewarding to notice the lovely *Azalea viscosa* [*Rhododendron viscosum*], so plentiful in low open woods, where the water table is frequently no more than 2 or 3 inches below the soil surface. In that thin area, azalea roots thrive and provide sustenance for a wealth of bloom.

Found on Shallow Soil

At the other extreme, the rose azalea in Vermont inhabits the top and sides of rocky moraines. There soil is at a premium between the granite and marble cobblestones, yet azaleas by choice nestle between the rocks, gaining ample nutriment somehow through a sparse root area.

No matter what the soil conditions are, whether the water table is 6 inches or 6 feet, whether the root bed is a clay loam or a quartz sand, ericaceous (heath family) plants generally, and rhododendrons especially, choose to sit almost on top of the ground. There they prosper if other conditions are to their liking.

In limestone areas, where the natural plant nutrient ratios in the soil are not

ideal for rhododendrons and azaleas, success in growing them depends as much on making all other conditions favorable for optimum growth as on correcting the soil pH to meet their requirements. Therefore, we must first know, at least in a general way, what conditions are ideal for these plants.

From examination of the root growth and soil structure in which they thrive, we know they require a loose, open, natural compost which permits ample aeration. They elect to grow in compact masses, either as pure stands or with other congenial species. *Rhododendron maximum*, in addition, will prosper only in shade, which should be high and dappled for bloom. Partial shade is also preferred by the swamp azalea (*R. viscosum*), which will respond with heavy bloom and adequate growth. All native rhododendrons and azaleas, in fact, find open woodland conditions much to their liking.

They Thrive on Acid Soil

Their native habitat has a soil with an acid reaction somewhere between pH 4.5 and pH 6.5. Such a condition is to be expected because of continual decomposition of leaves, twigs, and other plant ma-

Low wire fence holds oak leaf mulch in place around surface-planted rhododendrons.



Buhle

terial normally found on the forest floor. During the process of decomposition, leaf compost is acid in reaction, though it may later (when the action is completed) be neutral or slightly alkaline.

Simulating the conditions under which such plants normally grow should be the aim in planting them in a limestone area. First the pH of the soil should be known. Any one of several soil-testing kits on the market will give approximate information, if the person using it has had sufficient experience to interpret the reactions and translate the colors. In the colorimetric kits the testing solutions should be fresh, since they deteriorate and lose their effectiveness with age. Unfortunately, amateur use of such equipment has frequently brought about unsatisfactory results.

State agricultural experiment stations and county agents do soil testing and are better qualified than amateurs to make recommendations.

In choosing the site for either azaleas or rhododendrons, bear in mind that soil drainage is of prime importance. If the pH of the soil is above 6.5 it should be lowered even though the plants literally may be placed on top of the ground rather than in it. For increasing the soil acidity in this way, the recommended agent is

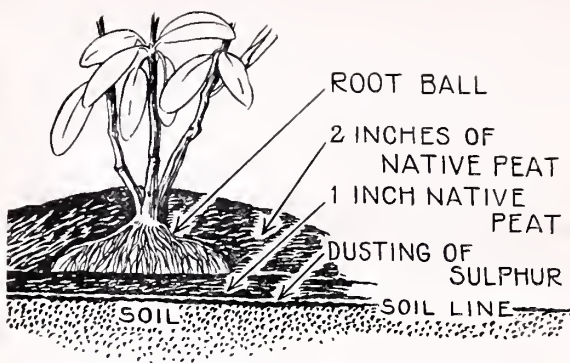
finely ground sulfur. The too-general practice of applying aluminum sulfate every year without knowing the chemical composition of the soil, has damaged more azaleas, rhododendrons, laurel, and other plants, than it has benefited.

Planting on Top of the Ground

A light dusting of sulfur on top of the ground is the first step when the pH is above 6.5. Next, an inch layer of native peat should be spread over the sulfur. Peat from Maine, New York, Pennsylvania, Michigan, or elsewhere may be used. Most of such material has a pH between 4.5 and 5.5*, is of good texture, and contains an adequate amount of plant food, especially nitrogen. Next, the plants are set and the root ball is covered with a layer of native peat 2 to 2½ inches thick after it has been tamped. Follow this with *thorough* watering by a fine spray—and that is all.

Such planting on top of the ground is unorthodox, but it has worked so well, not only in limestone areas but also in heavy clay soil, that it deserves consideration. If, however, you insist on digging a hole, believing the plants will blow over when set as described, make it so shallow

*Not all native peats are acid. If in doubt it is better to purchase baled peat moss.



Method of planting rhododendron on surface of ground. Layer of sulfur helps keep medium around roots properly acid in limestone areas.

that one half the root system remains above the ground line.

A few years ago, a group of *Rhododendron maximum* were in such a sorry condition that they were about to be discarded. They had been planted in the all-too-frequent manner of digging a hole too deep and shovelling over them 4 or 5 inches of the most readily available soil, regardless of whether it was topsoil or subsoil.

As an experiment, they were lifted, the excess soil was pulled away, and the original root mass was placed on top of the ground under the nearest tree, which happened to be a black walnut. No hole was dug for any of them, in fact the soil was in no way disturbed. With the root ball resting on top of the ground, native peat was shovelled over the roots until they were evenly covered with a well-packed 2-inch layer. Following this quasi-planting job, a fine spray of water was directed over them for 5 hours, after which they were left alone to see what would happen.

New leaves which appeared the following spring were longer and greener. In late June a few adventitious buds near the base of the stems broke into growth. By the end of the second growing season in the new location, growth was normal, the leaves, in size and color, were typical of the species, and the plants gave every evidence of finding their perch on top of the ground, even under a black walnut, to their liking.

Chemical analysis of the soil in which native azaleas and rhododendrons thrive usually shows a low plant nutrient content. Heavy fertilization is not recommended. Considerable success has been had by applying an annual light mulch $\frac{1}{2}$ inch thick, composed of 2 bushels of native peat, 1 bushel of Bovung, Drienure, or similar dried cow manure, and 1 quart of superphosphate. Mixed thoroughly and spread evenly over the root area, this combination seems to satisfy their mild longing for plant food.

Leaf Mulches

In some limestone areas oaks flourish. More often the preponderant trees are elm, beech, birch, maple, cherry, and ash, all of which, with the exception of beech, have thin, soft leaves that pack readily. These are unsatisfactory as a mulch for rhododendrons and azaleas, because a heavy application will mat so compactly as to prevent water from penetrating to the root area. If oak leaves cannot be had, no deciduous leaf mulch is recommended. Pine needles, because they do not pack and are slow to decompose, are excellent.

Rhododendrons and azaleas thrive if unpampered. Make the conditions under which they are to grow as ideal for them as possible and then leave them alone. If they are in full sun, no amount of watering and fussing will make them look healthy. If they are in partial shade (morning sun only preferred), they will prosper without artificial watering except in extreme droughts. Water in limestone areas, since it is usually high in carbonates, is not for rhododendrons except in an emergency.

Because the mistake happens too frequently, here is one last admonition. *Do not cultivate* under rhododendrons and azaleas. For every weed destroyed, hundreds of important rootlets are cut off. In such a place, weeds normally are few in number, so hand pulling is not an arduous task.

+Some authorities recommend less manure — $\frac{1}{4}$ to $\frac{1}{2}$ bushel to 2 bushels of peat.—Ed.

USE YOUR LEAVES!

They represent money in your pocket

William L. Meachem

Reprinted from *Flower Grower*, October, 1954

FALLING leaves are like drops of rain. As individuals their value is insignificant; when they are pooled together, though, their worth is exceedingly great. Each fall, nature generously provides us with the raw materials for many dollars' worth of compost and garden aids in the form of leaves. They're free, too, merely for the effort of taking and using. Swell, you say, but gathering leaves is **real** effort—but not if you know how!

Pulverizing Leaves

Sometimes you don't have to gather leaves; you can put them to work where they fall. This is especially true on lawns when you use a leaf-mulching attachment

on a rotary mower. These attachments, available for most rotary mowers either as standard or optional equipment, do the entire job. They pick up the leaves, pulverize them, and deposit them back on the turf as finely ground mulching material. The particles are so fine that they easily fall between the grass blades down to the soil.† Eventually they break down and add nutrient and organic value to the soil. Some experts say this is very little; but many grains of sand make a beach.

†This method is most effective on thick, level lawns because if turf is thin or there is much of a slope the particles will be washed away by heavy rain.—Ed.

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Leaves that seem so insignificant can be very valuable in the garden.

Wright



This mower isn't cutting grass, it is pulverizing leaves into a very fine mulch.

Simpkins





Gantner

Steel lawn rake comes in very handy for getting stray leaves out of corners.

Raking

Suppose, though, you're more interested in the garden borders than the lawn. In this case you have to get the leaves off the lawn and walks to a place where you can put them to work. The time-proved method of gathering leaves, of course, is with a lawn rake. The teeth of a lawn rake are set rather close together so you can rake together many leaves at one time. Also, the teeth are flexible so you won't hurt your lawn. Lawn rakes are usually made of bamboo or steel; some

Sweeper clears leaves and twigs from lawns and walks.

Simpkins



of the newer models can be adjusted to various widths.

Sweeping

The newest and by far the easiest way of removing leaves from lawns and walks is with a lawn sweeper. You've seen pictures of them, if you haven't already seen them in operation. They work on a revolving brush principle—like a carpet-sweeper—brushing the leaves back into a large hopper. For the extra large place, they are even available with gasoline engines for power.

Carrying

Getting the leaves into a pile is one thing; getting them to where you want to use them is another. Leaves are light in weight but very bulky, and you can't get too many in a bushel basket. A simple way of carting a lot of leaves is to rake or pile them on a large square of burlap. When you have a good pile on the burlap, gather up the four corners and you're on your way. There are several new twists of this age-old trick. You can get the flat carriers with handles, and there are also special canvas leaf-carrying carts that fold up when not in use. Any one of them makes leaf toting almost fun.

An ordinary wheelbarrow with its shallow tray won't hold too many leaves. However, since weight is no problem,

Wheelbarrow leaf baskets make carrying easy; either make or buy them.

Gantner



there's nothing to prevent you from building a wire frame for the top which will allow you to quadruple the amount of leaves you can carry in a wheelbarrow. If you don't want to go to the trouble of making such a rack, they are available—all ready to attach to your own barrow.

Composting

Now that we have gathered and carried our leaves, what are we going to do with them? One of the best places they can be dumped is on the compost heap. If you have a lot of leaves, you might even want to make a separate bin for leaves alone. Leaves will break down fairly quickly if they are kept constantly moist and you add some compost activator. They should be ready for use in several months, only they won't be leaves any more; they will have become leaf-mold compost—one of the best things you can add to your soil.

Mulching

But leaves don't have to be composted to be useful. They make excellent winter mulches for shrubs and perennials. The best time to apply a mulch to perennials is after the ground has frozen. You'll also have to be careful when applying to make sure that the plants stay completely covered all winter and the mulch will have to be removed just before they start growing in the spring. Also, use

Some kinds of leaves are excellent for winter mulching.

Wright



Roche

Another way to carry leaves to borders or compost heap is in a large burlap.

leaves that remain fluffy and don't become soggy.*

When mulching shrubs, the mulch can be applied almost any time, and won't have to be removed in the spring.

Making good use of your leaves is sound garden practice. In time you will come to welcome them each fall as money in your pocket.

*Top honors go to oak leaves and pine needles. Leaves of most deciduous trees if used as a mulch make compact mats preventing water from getting into the soil.—Ed.

Rich, black leafmold can be yours, made by composting leaves.

Roche



ROADSIDE RAIDERS

Spurning ecology in the name of "brush control"*

Frank E. Egler

Condensed from *Nature Magazine*, October, 1954

THE problem of managing the unwanted brush on the roadsides and along the rights-of-way of telephone and power companies in forested regions, is becoming increasingly serious. The aggregate acreage is enormous: in some states equal to an average entire county. Yet most of this huge acreage is being misused in ways contrary to ecological knowledge.

Were the destruction, the harm, and the unnecessary expense solely restricted to the landowner, we might dismiss it with a shrug. But part of our national heritage is involved—the populations of small birds and other wildlife; wild flowers and the beauty of our roadsides; fire hazards of the vegetation. Thus it is a citizen's problem; a local community problem.

The Problem

"Brush" is a normal phenomenon, a half-way stage in Nature's process of recovering land with the forest it once bore. There are many places where we do not want brush. We do not want it on our lawns, our gardens, our orchards, or our pastures. Neither is it wanted on parts of roadsides where it would overhang the pavement or obstruct vision. It cannot be tolerated on rights-of-way

of power and phone lines where it would grow into the wires, disrupt service, and make repairs difficult. Hand cutting of brush has become increasingly expensive; is now all but prohibitive.

In 1945, certain herbicides came into use. These were "selective" in that some plants were resistant, such as grasses, and thus the soil was not bared and sterilized. The chemicals include the 2,4-D and 2,4,5-T compounds, and ammonium sulfamate, none of which are poisonous to animals—although unnecessary destruction of animal habitat can be worse than killing the animals themselves. Such sprays could be applied broadcast, with power equipment. They resulted in a rather striking kill-to-ground, although by no means a good root-kill. But the subsequent grassland was rather pleasing to the eye, and costs were less than hand cutting. So such technique has certain attractions. Manufacturers and contractors vied with each other in promotional programs. Spray-happy, with a true American zeal for big equipment and for chemicals, they did not look, and to a great extent are not looking, beyond the immediate present.

What Is Being Done

One has only to drive through the states that are not in grassland or desert to realize the tremendous mileage now being subjected to indiscriminate blanket-spraying. Mile after mile of both state

*The science of ecology deals with the relationships of living things to one another and to their surroundings.

highways and secondary roads are seared in summer with unsightly scorching of all flowering herbs and shrubs, ruining habitats for birds and mammals. Admitting that brush control is necessary, is this destruction really necessary? The answer is "no." It is frequently an unnecessary expense to the landowner and the taxpayer, and an unnecessary destruction of community values.

Grassland is being produced where it is as superfluous as a deep-freeze among the Eskimos. Often roadside vegetation has been sprayed back for 20, 25, or more feet. Some grassland is needed near the shoulder of the road, but next to this ornamental shrubs are usually planted by highway landscapers, and there it is most logical to preserve existing viburnums, laurels, azaleas, and other native shrubs.

Selective Basal Spraying

In distinct contrast to the indiscriminate blanket-spraying, a different technique involves selective basal spraying of only those plants that are not wanted. This work is usually done in winter, and with small knapsack sprayers. Such spraying results in a slower, but more effective root-kill of woody plants. Actually, after four years of commercial operations, the technique is found to be on a competitive price basis for all ordinary kinds of brush. It is in the post-spraying vegetation that this technique differs completely, not resulting in grassland, but in a mixed cover of flowers, and flowering and berry-bearing shrubs. Only the unwanted young trees are killed out.

Ecological Principles Involved

Using spraying as an ecological "tool," we may, for approximately similar costs, produce grassland relatively devoid of broad-leaved herbs, or a mixture of shrubs with what grasses may be among them. Scientific information is already available as to which vegetation types are cheapest to maintain. The stability of the plant community must be considered, and its resistance to invasion by unwanted trees. Indiscriminate spraying so widely practised on the highways of the nation is in

a large measure unjustified from an economic viewpoint, even if the numerous conservation values were not also involved.

Supporting Scientific Evidence

Foresters in the Southeast have long realized that reforestation is slowed down when a shrub stage replaces the grass. Where the forester is dissatisfied, the roadside manager can take advantage.

On the Ten Mile River Scout Camps, Sullivan County, New York, a fireline has been covered with low shrubs since 1936, with tree seedlings unable to enter. Specific right-of-way studies are in progress on twenty-two research areas in eleven eastern states from Florida to Vermont. Furthermore, commercial selective spraying, according to this system, has now extended south to Alabama, and into the Middlewest in Illinois and Wisconsin. It is from these numerous sources that one can make generalizations, even while being conscious of certain local exceptions due to the never-ending variety in the regional plant communities.

What Naturalists Can Do

Naturalists have a large stake in this problem. Roadsides in the country are a never-ending source of study and pleasure. They provide food and cover for quail, grouse, pheasants, and song birds. They are alive with a continual succession of wild flowers throughout the season. You need not let them be destroyed. Get acquainted with the local highway commissioner, and the local telephone and power companies. More likely than not, they are unfamiliar with the botanical pros and cons of the different kinds of sprayings. Do not think that you are asking a favor. By satisfying your own interests, they will better serve the interests of the public, and such relations have a tangible value to them. It is unwise to wait until indiscriminate spraying is already done. Then, not only is damage done, but faces must be saved, regardless of how "right" you may be. Save your country roadsides. The responsibility is yours.

SQUATTER'S DEMISE

Stump removal—a resumé of effective methods

M. W. Staples

Reprinted from *The New York Times*, November 7, 1954

With added illustrations

LIKE a visiting relative who overstays his welcome, an unwanted tree stump in the back yard may require ingenuity and quite a lot of effort to dislodge. How to get rid of it is a real poser to the home owner, who would like an "easy way out." A number of products are on the market which are said to make it easy to burn the stump. Another group of items is supposed to cause the wood to decay in a matter of months.

But actually the success of either method, burning or chemical deterioration, seems to be uncertain. According to personnel of the Davey Tree Expert Company, they have never found it successful to burn an appreciable portion of a stump by impregnating the wood with oil, saltpeter, or another substance. Under certain conditions, large stumps can be burned out. However, they require a huge amount of fuel applied over a long period of time—several days, in fact.

Laws of the Land

Burning is further limited by smoke abatement and fire laws enforced by most cities and residential districts. All things considered, burning of large stumps is quite likely to be impractical if not impossible in urban areas and seldom feasible in rural areas.

The chemicals that are supposed to cause stumps to decay in a matter of weeks or months may offer some possibilities of easy disappearance. To date, however, we have been unable to prove them adequate in field trials.

The quickest and easiest method of removing stumps, large or small, is with the assistance of a skillfully operated bulldozer. In a practical way this can apply only to a new property being graded. The new home builder can save himself a great deal of muss and some expense if he can prevail upon the grading contractor to remove stumps when preparing the subgrade. For the established place, there seems to be no painless method. On large estates, however, stumps away from buildings can be removed with explosives.

For the average suburban dweller, the best and most practical means of removal is the tried and true method of cutting the main roots and pulling the stump from the ground with a heavy tractor or winch-equipped truck. Larger roots must be cut with an ax or mattock and a strong cable attached to the top of the trunk. To get proper leverage for removal, stumps should be cut 10 to 12 feet above the ground. Too often the mistake is made of cutting the trunk close to the ground.

Large roots must be cut before stump can be removed by tractor and chain. Trees with tap-root system may be difficult to take out in this way.



Pulling the stump out; tree has been cut off about 10 feet above ground to provide proper leverage.

Buhle photos





Prior to removing stump by boring, tree is cut as low as possible and earth removed to expose buttress roots.



Heavy roots are cut. If power saw is used, as here, great care must be taken that sand and rocks do not damage it.

A Simple Solution

A new and modern variation of this method calls for cutting the stump as low as possible. And here the modern chain saw is a tremendous help. With the stump cut within an inch or two of ground level, at least the top 6 inches of the stump can be removed with mechanical wood-boring devices. Some of these are the large augers mounted on heavy tractors. Or far more practical from a transportation standpoint are the stump-boring attachments that fit certain makes of power saws.

The newer process consists of boring a

series of large holes straight down into the solid wood. Holes are so located that they will overlap where possible. When there is no longer room for more holes, the remaining wood is chipped off with an ax or adz and the chips are hauled away or added to the compost pile. When the stump has been removed to a depth of 6 inches below ground level the depression is filled with topsoil and the lawn reseeded. Strangely, the process works better on freshly cut, solid stumps than it does on partly decayed or hollow stumps.

One of the commonest and perhaps

Remaining projections of wood are chipped away.



Depression is filled with soil.





Boring starts with stubs of buttress roots. ➡



Most of wood is removed by boring overlapping holes.

cheapest of all procedures is to cut the stump as low as possible and then to let nature take its course through deterioration. With elms, maples, and birch, this is fairly satisfactory since decay is quite rapid. On the other hand, such enduring varieties as oak, locust, catalpa, and cedar will last for many years. In any event the process can be speeded by making doubly certain that the stump does not sprout and grow. This is easily accomplished by soaking the stump top and buttress roots with a strong solution of ammate, a relatively safe herbicide.

In my experience and that of others, the difficulties encountered in removing stumps are in exact ratio to the size of

the tree. Unusually large trees present a most difficult problem. For in such cases stump and roots, with the earth ball, may weigh 20 tons. It is sometimes practical to "bury" the stump by digging an enormous hole alongside it and pushing the stump over into the hole. Then, however, the ground may be settling for years afterward.

The home owner himself rarely is equipped to handle the complete removal of a tree or stump. For trees with trunks more than 10 inches in diameter, he should call in the professional tree experts. They are properly trained to lower branches one by one and remove the stump efficiently.

Sod is put in place. ➡



Lawn completely restored.

Photos courtesy Davey Tree Expert Company





MH-40 checks
sprouting of
stored bulbs;
treated onions
on left, untreat-
ed on right.

Author photo

GROWTH CONTROL WITH MH-40

A new chemical tool for gardeners

Emery Radwany

Condensed from *American Nurseryman*, August 15, 1954

IN THE broad field of using chemicals in plant culture, great progress has been made in a few decades. From a simple beginning with Bordeaux mixture, the use of chemicals has become more and more widespread, and now it is often difficult to keep up with new developments.

These substances came into service in more or less the following order: (1) fertilizers—to nourish plants; (2) insecticides—to kill insects; (3) fungicides—to prevent fungus growth, and (4) herbicides—to regulate, kill, or prevent weed growth.

The last group covers a wide field comprising many chemicals, one of the most important of which is 2,4-D, a selective formulation which controls by hormone action.

Promising New Chemical

In the past year and a half there has been the unfolding of a remarkably significant new chemical called maleic hydrazide, popularly known as MH-40. Present evidence points to the increasing importance of this chemical because of its manifold uses. With its inception a new group has thus come into being, so that one may now list (5) growth control.

Surprisingly, maleic hydrazide was first discovered in 1895 by two German chemists, Curtius and Fosterling. But at that time its possibilities were unforeseen, and it was not until 1947 that O. L. Hoffman again brought it to light in the Bethany, Connecticut, laboratory of the Naugatuck Chemical Division of the United States Rubber Company. This company, which has introduced such splendid fungicides

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343 S. Dearborn St., Chicago 4, Ill.

as Spergon and Phygon, included it in elaborate tests of a number of chemicals. This was done primarily to screen them for fungicide qualities but with an open mind as to their other potential uses. MH was soon proved to be a nonconformist. As a fungicide it was not too effective, but instead, behaved in a goblin-like fashion. Somehow, it caused plants to cease growing. The Bethany laboratory mailed out several hundred samples to research workers all over the country and began new experiments of its own.

Experiments at Purdue

As the work progresses, booklets and articles are being published. From Dr. A. C. Leopold's experiments at Purdue University this is known: Auxin is a hormone substance in plants that stimulates vertical growth. MH-40 has been found to work in opposition to auxin and thus slows down the growing tips. In the spring a plant produces much auxin and this consequently stimulates rapid growth of long stalks and seed heads. When treated with maleic hydrazide, the auxin is apparently neutralized and lateral growth ensues.

Limited Value on Lawns

Practical employment of MH-40 thus has almost unlimited potentialities. Much work has been done on the growth of grass, first on Connecticut highways, then in cemeteries and several experiment stations. The control is obvious, and since maleic hydrazide is a readily soluble powder with low toxicity, it is easy to apply. Three ounces to 1,000 square feet is safe and effective. Grass should be at least 2 inches high when sprayed, and by the end of a week or 10 days, absorption will have taken place. The grass can then be cut to any desired height. It may become temporarily discolored and uneven later, and the tidy home owner may find this disconcerting. MH is therefore recommended as more suitable for difficult areas such as banks, along fences, around tombstones in cemeteries, on the grounds of outdoor theaters, and along highways.

Onion and Potato Storage

Applications have also been made on potatoes and onions as a pre-harvest spray when the tubers and bulbs are fully matured but the foliage not yet dead. This controls the sprouts in storage. In the South, it is effective on tobacco to control suckering.

Chrysanthemum Height Controlled

Chrysanthemums respond to treatment well, and Dr. Leopold has found that a 0.1 per cent solution results in at least as good potted plants (with more lateral growth) as the pinch treatment. This, however, is still in the experimental stage.

One of the newest and most exciting applications of maleic hydrazide is its employment on hedges. Dr. J. E. Knott, of the University of California, was the first to treat a *Pyracantha crenulata* hedge with MH. After trying various solutions, while leaving two sections untreated, one clipped and one unclipped, he published in 1950 the following striking results (Proceedings of the American Society for Horticultural Science, Vol. 55): "... With a solution of 0.5 per cent maleic hydrazide, new shoot growth is completely checked for at least a month and greatly retarded for several months. No injury to the evergreen foliage or any partly developed berries is apparent." Repeated treatments for several years gave no evidence of injury.

Two sprayings will control the growth practically the whole season, with only one trimming necessary. This does not mean that the trimming shears can be discarded; however, they will be needed only to shape up the treated sections evenly.

The use of MH-40 will be of interest to many home owners, professional grounds keepers, and nurserymen.

Just as fast results can be produced with fertilizers through foliage feeding, now rapid growth can be controlled so that plants will not shoot up and produce ungainly stalks, but be compact and well contained. Gardeners have here therefore a new tool and a new vista. This instrument of science used wisely and well will be of great benefit.

FACTS ON LIQUID PLANT FOODS

*Latest appraisal of the value of
soluble fertilizers in horticulture*

O. Wesley Davidson

Condensed from *Popular Gardening*, July, 1954

SINCE 1950 liquid fertilizers have been enjoying a new-found and steadily increasing popularity among home gardeners.

Let's see why gardening enthusiasts have adopted liquid fertilizers. In the first place, there is little risk of injuring plants when liquid fertilizers are used even roughly in accordance with the manufacturer's directions. In contrast with this, it is common for the amateur gardener to use regular dry fertilizer in excessive amounts that are injurious or even lethal to some plants.

Secondly, small amounts of fertilizer applied with water are extremely effective in stimulating plant growth on a wide variety of soils. In this respect due credit must be given to the water, for it comprises 90 per cent of the fresh weight of most of our herbaceous plants and oftentimes, no doubt, garden plants need water as much as they need fertilizer. Moreover, the water is most effective in transporting nutrients through the soil to plant roots.

Finally, a gardener can apply liquid fertilizer conveniently over rough ground or smooth, and he can do it with considerable accuracy.

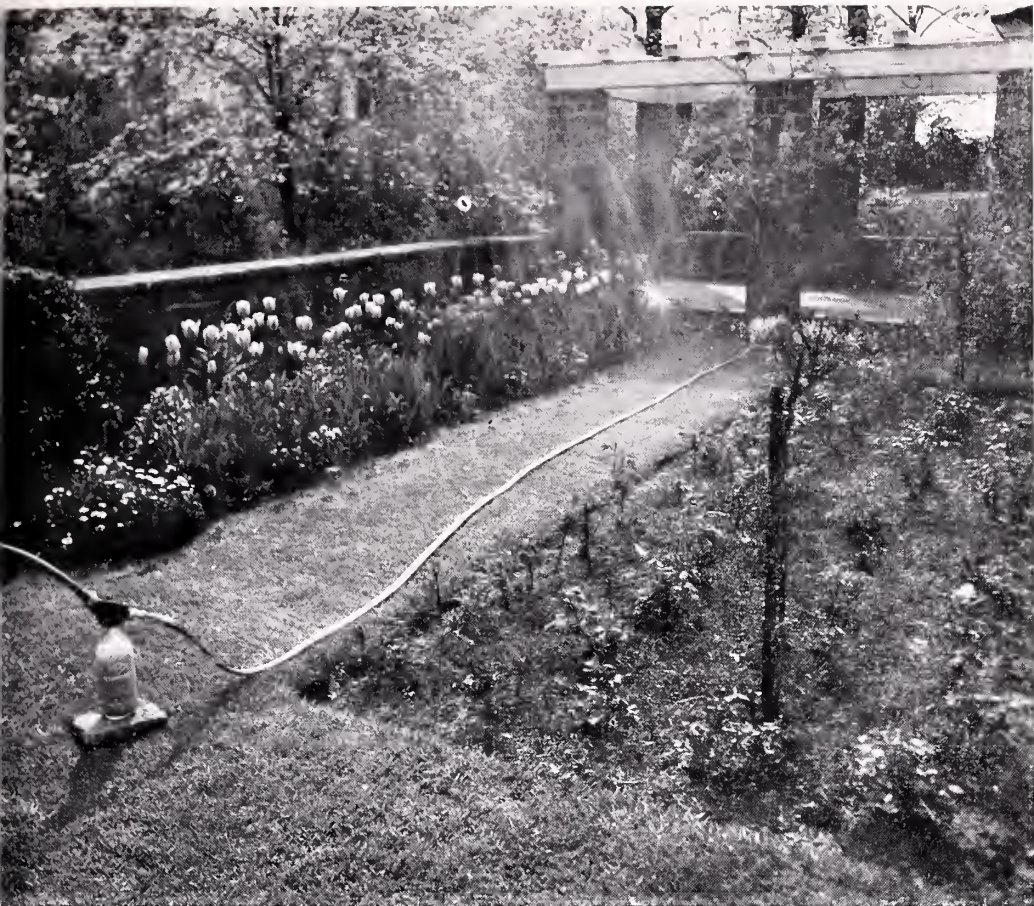
Liquid plant foods, then, offer numerous advantages over the conventional dry

materials. Present-day methods of applying the liquids, however, can be cited as a disadvantage as well as an advantage. It's true that where relatively small lawn and garden areas are involved, and assuming that watering has to be done anyway, the soluble fertilizers simplify plant feeding. But where the area to be fertilized is large, this is not the case. In fact, it takes so long to apply liquid fertilizer in effective amounts to large areas that fertilizing can still be done much more quickly with dry materials and a small distributor. The reason is that present applicators are not designed for large-scale liquid feeding.

Preparation of Liquid Fertilizer

Liquid fertilizers can be prepared from regular dry fertilizers, from manures, from concentrated liquid fertilizers, or from specially prepared soluble fertilizers. The common dry fertilizers dissolve slowly and incompletely, hence they are not conveniently used for the preparation of liquid fertilizer. The preparation of liquid manures is time-consuming, messy, and wasteful. Concentrated liquid fertilizers are usually expensive, due largely to the cost of packaging and shipping the large amount of water involved.

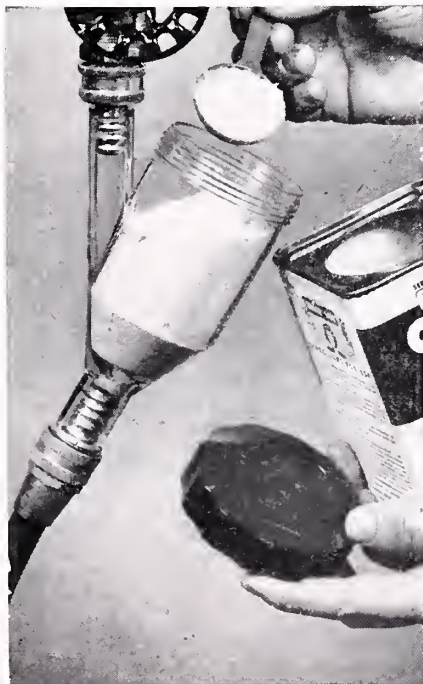
Soluble fertilizers, on the other hand,



Doggett-Pfeil

Breck

Liquid fertilizers are most easily and efficiently used with a garden hose applicator. The device above, attached to either a faucet or a hose, dilutes a liquid concentrate with the water. The one at right attaches to the faucet and uses dry material.





Monsanto

Cucumber seedlings grown in a good potting soil: *left*, check; *right*, foliar fed with liquid plant food

are made expressly for the preparation of liquid fertilizer. They may include as many or as few plant nutrients as the manufacturer wants to put in them. A good soluble fertilizer, therefore, may contain the same nutrients as any other good fertilizer and may be equal in all respects to the latter in stimulating plant growth. As for comparative cost, an excellent soluble fertilizer need cost little more, per unit of nutrient, than a high-grade dry one.

Soluble fertilizers, even those of the same grade, are not all alike. Different brands vary considerably in composition one from another. Some contain many more plant nutrients than do others—especially the “trace” nutrients. In general, soluble fertilizers with the highest

Coleus plants grown in average garden soil: *left*, root fed with a complete plant food solution; *right*, check

DeWitt



guaranteed analyses tend to contain the fewest nutrient elements. In most cases this is necessitated by the fact that the amounts of ingredients used per pound of fertilizer to insure the guaranteed analyses leave little or no room for other nutrients. The highest guaranteed analysis, therefore, does not usually represent the best fertilizer.

Essential Nutrients

Garden soils are far more variable than farm land. In many instances the former are made from subdivisions of land that is submarginal for agricultural use. Very often a garden area has been developed from fill material. Because of this, fertilizer recommendations for garden soils must be based on broad generalizations. This is justified in that we know that all plants require some fifteen different nutrient elements.

Trace nutrients are conveniently and effectively included in some of the soluble fertilizer preparations available today. When the fertilizers are used according to recommendations, the amounts provided in some instances correspond to the amounts of trace nutrients that would be contained in liberal applications (10 to 20 tons per acre rates) of animal manures. Such quantities of trace nutrients may be considered “maintenance” or “replacement” amounts, and should not be confused with “corrective” additions of these nutrients.

Avoid Overdoses

“Corrective” amounts of trace nutrients comprise relatively large quantities of these elements and are intended specifically for use in correcting recognized deficiencies. “Corrective” amounts of trace elements should be used *only* on soils and crops for which their need has been established.

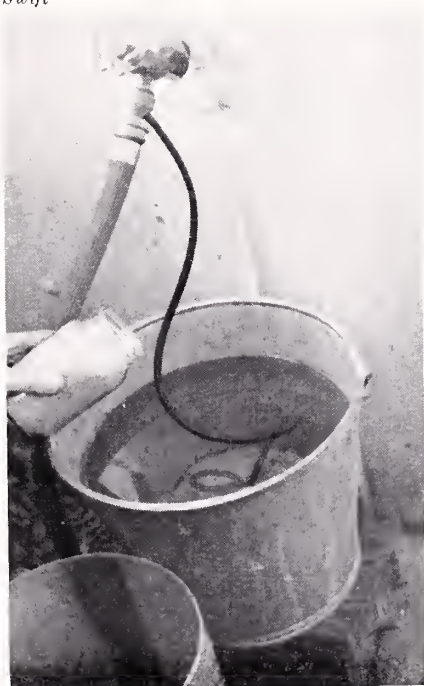
Unwarranted claims of beneficial effects from trace nutrients have been made by some fertilizer manufacturers. Fortunately, not all soils are deficient in one or more of these nutrients. Where the latter are not lacking, no benefit whatever can be expected from supplying them, at



Swift

Monsanto

Siphoning devices mix a concentrated solution contained in a pail or other receptacle with the water that passes through the hose and can be attached either at faucet (*right*) or at end of hose (*above*). Application is by nozzle, sprinkler, or soaker.





Nutritional Concentrates

Larger, more elaborate applicators such as this one hold up to 10 pounds of material and will treat areas up to 20,000 square feet.

least insofar as a given season is concerned. The one benefit that should accrue is that the inclusion of "maintenance" or "replacement" amounts of trace nutrients may prevent the occurrence of deficiencies in the future.

Foliar Feeding

Some plants can absorb all nutrients through their leaves, and in some cases, through their stems. Certain plants, however, possess heavily waxed surfaces that restrict or inhibit nutrient absorption. Except for urea nitrogen, and magnesium, spraying to provide supplies of the major nutrients by foliar absorption alone does not appear to be practical at present. On the other hand, foliar spraying to provide trace nutrients is not only practical but is usually also highly efficient.

For the home gardener it would appear wise to restrict foliar spraying to the drenching of his plants at the time of application of liquid fertilizer to his soil.

In this connection it will be worth noting that foliar absorption is much more rapid through the lower than through the upper leaf surfaces. Moreover, when applying liquid fertilizer to foliage, do not use solutions that are more concentrated than the following:

5 ounces of a 12-12-12 or a 13-26-13
in 10 gallons of water

4 ounces of a 15-30-15 or a 16-16-16
in 10 gallons of water

3 ounces of a 20-20-20
in 10 gallons of water

or corresponding amounts of other grades

Starter Solutions

Liquid fertilizers are particularly beneficial in assisting transplanted seedlings and rooted cuttings to become established. Liquid fertilizers applied to young plants in beds or flats one to three days previous to transplanting, have proved more effective than applications at the time of planting. This is not always practical, as for example, when one is transplanting bought plants. In the latter case, when setting them into the garden, apply $\frac{1}{2}$ to 1 pint of liquid fertilizer to each plant, preferably when the roots are covered with only an inch or two of soil.

Lime to Correct Acidity

In the humid sections of the United States most of the soils tend to become strongly acid unless limed every two to five years. Your county agricultural agent usually can advise you about your lime requirements. This is most effective when supplied in the fall. If lime is to be used over or around plants, do not use the hydrated form. It is apt to injure plants and tends to cake badly unless well mixed with soil.

Soils that are unduly acid for the plants growing on them respond poorly and inefficiently to fertilizers. In order to get the maximum benefit from liquid fertilizer, be sure your soil is adequately limed.



MOROCCAN JOURNEY

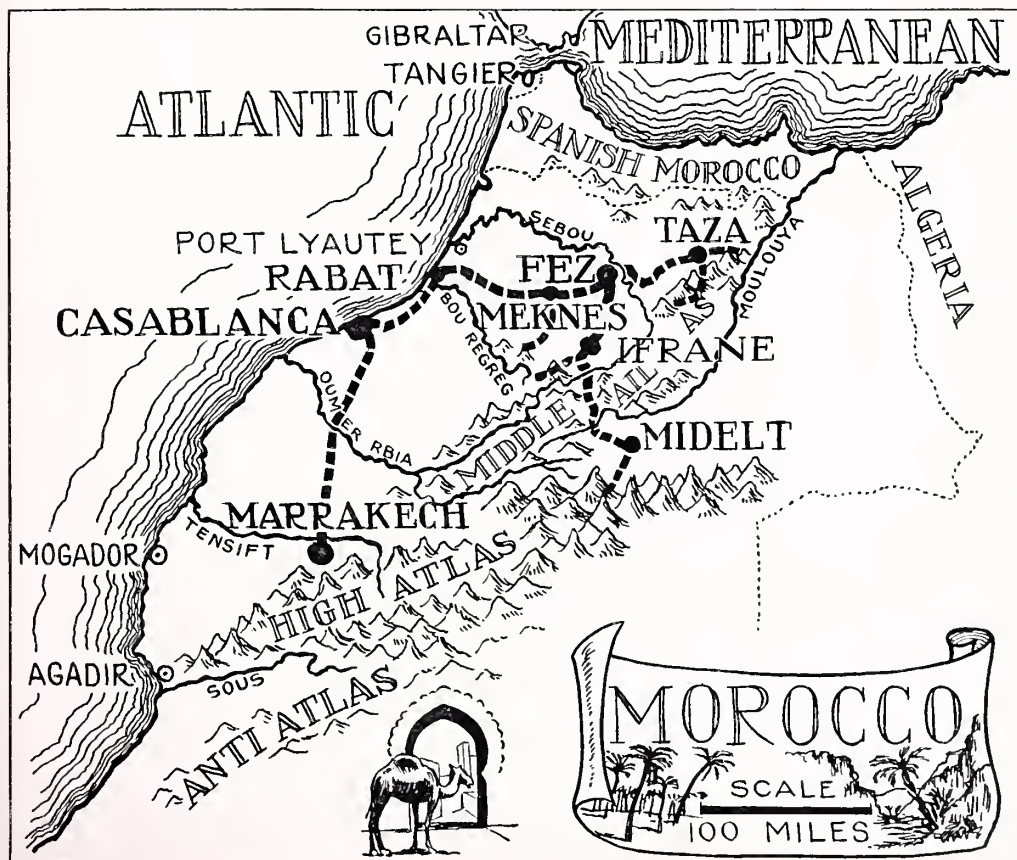
Plants and people, mountains and deserts

George S. Avery, Jr.

The mountains and mountain valleys of the countries around the Mediterranean Sea are the native homelands of many of the world's loveliest ornamental plants. It was primarily to see some of these growing in the wild that we joined an expedition into the mountains of Morocco in June, 1954. Once there, we found many aspects of life in Morocco to be interesting and markedly different from our own.

Starting from Rabat (see map), we traveled about a thousand miles by motor coach, jeep, and panel truck, and on two

occasions in an antiquated bus. Meknes, Fez, and Taza were the main cities en route, and at Azrou we began the ascent into the middle and high ranges of the Atlas Mountains. Ifrane and Midelt were our headquarters towns in the mountains. The ranges of the Atlas run northeast-southwest, forming a great Moroccan backbone that separates the Atlantic coastal region from the Sahara. Three principal rivers flow into the Atlantic, and one flows northeastward into the Mediterranean.





Too great a population for an agricultural economy in a dry country compels use even of land far up the arid slopes. Taza lies in the distant valley.

Much of Morocco is desert or near-desert, similar to the arid portions of the American Southwest—such as parts of western Texas, Arizona, and California. In sharp contrast, there are small areas on plateaus and in the mountains, in which there is up to 100 inches of rainfall a year. But whether much or little rain, it comes chiefly in late autumn and spring, with a December-January dry period, and a long arid summer. The diversity of geographical situations (from sea level to high altitudes), and the varying rainfall, lead to an equal diversity in types of vegetation.*

We had almost daily contact with Arabs and Berbers, and saw their mode of life in the villages and cities: how they farm, look after their flocks, and weave their rugs. In their market places they were buying, selling, and “manufacturing”

their wares. Only men and boys manned the shops.

A Land of Contrasts

Morocco is a land of sharp contrasts. In the countryside, there are smooth roads and modern vehicles, but also the donkey-back transport of the Arabs and Berbers. In the cities are many new apartment houses and European-style gardens— islands of Western civilization as we know it, in the midst of a primitive society whose customs and whole mode of life have changed little in a thousand years.

Historically, the Romans introduced the wheel into Morocco early in the Christian era. When the Arabs took over in the 7th century, the wheel dropped from use and Arabs and Berbers still prefer donkeys—or their wives—as “beasts of burden”. The constant coming and going on donkey-back is one of the striking characteristics of Morocco, for although the French re-introduced wheeled transport, it has made little progress with the native population.

*The trip was arranged in connection with the VIIIth International Botanical Congress, by Dr. Charles Sauvage, Chief Botanist of the Cherifien Institute of Rabat, Morocco.



Author photos

Transportation—old and new—on a Moroccan highway.

Economy

Here are a few general impressions. The wealth of most of the native Moroccans is in their flocks: goats, oxen, sheep, donkeys,

calves, and camels, in the order of their numbers. Their wealth is also in the land, but the flocks are their mobile stocks and bonds. In spite of this, they raise no food for their flocks, even though they might lose 80 per cent of them every 5 years or so because of bad grazing conditions (drought). Allah, they reason, gave them the flocks, and Allah will take care of them. The forests also once constituted an important Moroccan resource but in many places they have been nearly destroyed, in part as a result of overgrazing. The barren, overgrazed, and eroded slopes provide no natural seedbeds for trees to perpetuate themselves.

The participation of the French in government ("colonialism", if you will), has given Morocco fine highways, railroads, buses (making possible "civilized"

travel), international markets, medical care, schools, prevention of further deterioration of the forests, and other advances.

Botanical High Spots

The expedition was memorable throughout, but from the angle of botany—and its impact on the economy of the country—there were four or five high spots. One of these was a day in a cork oak forest that extended 2000 to 5000 feet up a mountainside in the Middle Atlas; another was the day on Tazekka, where we climbed among the aged and magnificent Atlas cedars. The trips to a vast desert stand of "alpha grass", and to an ancient forest of juniper (*Juniperus thurifera*) helped us to understand the problems of the country, and the visit to several demonstration plots where arid and eroded hills were being successfully reforested gave sign of hope for the future. On such side trips our deluxe motor coach was generally abandoned in favor of the smaller vehicles—or walking. On one trip into the High Atlas at Ayachi, we climbed many miles to an elevation of about 10,000 feet, accompanied by Berbers on donkeys.



Busy "lumber mill" in a forest of Atlas cedars

Vastchenko

Some Berber tribes from the Sahara still move flocks and goat-hair tents to the high Atlas for summer. In this valley were over one hundred tents, some housing as many as thirty people.





For Those Interested In

BETTER GARDEN CLUB PROGRAMS

300 sets of special program material are available. Each set contains the yearly reviews and digests of the more significant articles that have appeared in all gardening and horticultural magazines from 1949 to 1954 inclusive. These were originally published as winter issues of *PLANTS & GARDENS*. In addition is included the comprehensive eight-year index to *PLANTS & GARDENS* plus a "bonus" leaflet with ideas galore for self-operated programs for Garden Clubs.

First come, first served
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be available.

(See other side)





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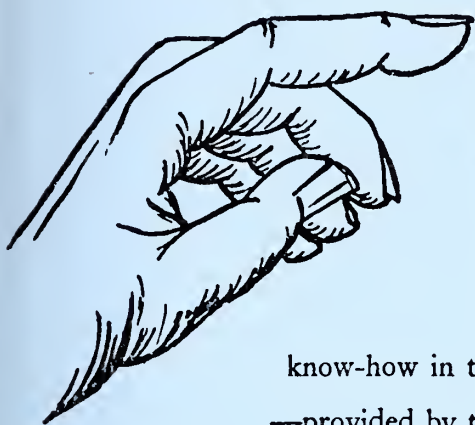
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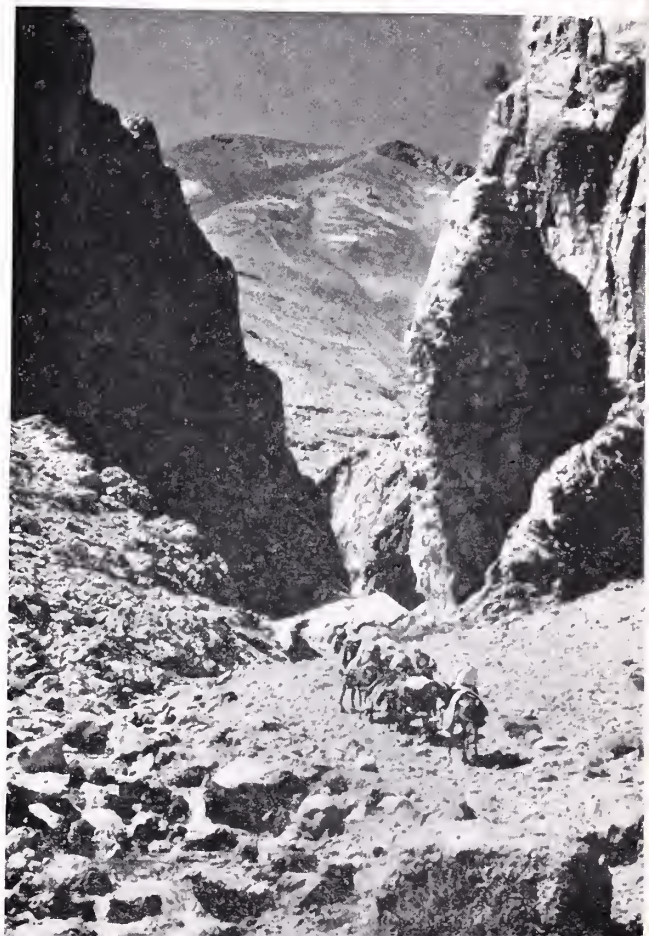
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Harvesting cork on the steep
slopes of Bab Azar



This gorge lies on one of the historic
routes through the high Atlas to the
Sahara. In the valley beyond were
forget-me-nots and buttercups, watered
by the melting snows.



Delphinium is a roadside weed in parts of Morocco.

Whenever high altitude fatigue overtook a member of the party, an obliging Berber would insist that he ride—and would thoughtfully hand over what looked to be

A rocky crevice in the high Atlas is the abode of this attractive blue geranium; on a cliff nearby grew clumps of fumaria (*Fumaria rupicarpus*).



a steel knitting needle, the native version of spurs, but applied by hand. Exchanges with the Berbers were numerous on such occasions, and all in fine humor, but their language was as impenetrable to us as the donkey buttock was to the knitting needle.

The Forest of Bab Azar

In general it seems to be next to impossible to interest the native population in preservation of forests, so a primary objective of the government is to keep the forests intact. We were told that were it not for the forester and his five men in this forest, all the trees would probably be cut in a season. Such seems to have been the forest history of Morocco—the Moslem philosophy being that Allah will take care of the future. Denuded hills and diminishing forests indicate that Allah needs help to provide for the firewood and limited lumber needs of the people, and pastures for their flocks. Bab Azar has some 22,000 acres within its borders, and enjoys an abundant 36 to 40 inches of rainfall per year, and considerable snow. August temperatures may be as high as 140°F., and in winter the thermometer falls to about freezing. It is chiefly a forest of cork oak and holly oak. In addition to the cork harvest, some 15,000 cords of wood are cut each winter and sold in the spring at auction for firewood and chareoal. Although Moroccan forests are state owned, there are reservations for tribes, and the people have certain privileges—pieking up firewood and cutting trees for making dwellings and tools such as ploughs, etc.

Wildflowers

On the forest floor of Bab Azar, in semi-open places, bracken fern (*Pteridium aquilinum*) had largely taken over, and along occasional streams we saw the royal fern (*Osmunda regalis*). We also saw foxglove (*Digitalis*) and *Cytisus grandiflora*. The common large heath was *Erica arborea*. And a relative of our rose daphne (*Daphne cneorum*), but not as nice a plant, was *D. gnidium*. Handsome

herbaceous plants were *Lavandula pedunculata* (grown in cultivation in California), *Tolpis barbata* (yellow composite with a chicory-like flower), *Campanula rapunculus*, and *Catananche caerulea* (grown as a perennial in California, can be grown in the northeastern states as an annual). It was quite a surprise to see foxgloves and hollyhocks growing in the wild, as well as English ivy, English holly (*Ilex aquifolium*) and yew (*Taxus baccata*). And along the stream beds in the valleys oleander (*Nerium oleander*) grew in profusion. The commonest familiar weed was the wild carrot (*Daucus carota* var. *marimus*), and in places "cheeses" (*Malva rotundifolia*).

Tazekka

If any one day can be singled out above the others, it was for me the day on Tazekka. This sacred mountain of the Arabs is a national park, and growing on its higher elevations is a thousand acre forest of Atlas cedar (*Cedrus atlantica*). These magnificent old wind-blown and misshapen trees have character beyond description. Many have large trunks but are not tall. I counted the rings on several stumps and they ranged up to 375 years old for a tree three feet in diameter. On the ground beneath them, in mid-June, were tulips in full bloom (*Tulipa sylvestris* var. *australis*), mountain daisies (*Anthemis pedunculata*) and superb violets (*Viola tricolor* var. *parvula*). Also a beautiful small calendula



Blossoms of wild gladiolus and wild tulip; the pen indicates their size.

(*Calendula algeriensis*), and a grape hyacinth (*Muscari comosum*) without the "grapes".

Most striking of all was a small dark red gladiolus (*Gladiolus byzantius*), which is more or less common throughout the Mediterranean region. And with it grew a beautiful deep blue geranium (*Geranium malviflorum*).

The peak of Tazekka is about 7,000 feet in elevation. On top is a United States radio station to guide planes safely through the Touahar Pass, and rangers keep a lookout for forest fires. Beside the radio station is a rectangular outline of rocks, marking an open Arab "church." Each Friday a lamb is sacrificed there

Vast stands of alpha grass grow in high altitude deserts.





Reforestation of arid slopes is made possible by contour trenching which holds the scant rain water until it soaks deep into the soil.

with simple ceremonies. As a sacred mountain, Tazekka draws many people. We passed men and boys as we went up the trail beyond the roads, and I remember well one Arab in his red fez, sitting under an Atlas cedar and gazing across a denuded range that stretched between him and the snow splotched High Atlas in the great distance.

Alpha Grass

Alpha grass (*Stipa tenacissima*) covers about 8,500 square miles (5½ million acres) of the cold arid zone of Morocco (high altitude desert). It is the only Moroccan grass of commerce, the others

being pasture grasses or food grains. This tufted grass is hand harvested and baled, and some 40,000 to 60,000 tons are shipped to Scotland each year, where it is made into high quality paper. Only the leaf blades are harvested, by wrapping them around a stick and pulling. One man can collect 700 to 900 pounds per day.

In most of the alpha grass region there are no trees, so it is also used for fuel by the sparse population of the region. We touched a match to a single tuft and it burned with incredible heat for about a half hour. Water is so scant in the alpha



Arab family enjoys botanic garden in Rabat



grass regions that the population density is very low. Hence only about a third of the potential harvest is ever collected.

Reforestation

With the exception of special areas, most of Morocco gets very little rain. To successfully reforest such areas is a challenge, and French foresters have worked out a technique for achieving it. The method is called "terracing". It consists of contour trenching the eroded slopes, the trenches being 10 to 15 feet or more apart. Each trench receives the run-off water from the slope above it, so if there is but 5 inches of rain annually in a particular region, the total accumulation in the trench might, for example, be 50 inches or more. During the sparse autumn and spring rains, the trench water soaks into the soil to a considerable depth and certain species grow successfully and live through the several months of hot arid summer. Aleppo pine, eucalyptus, Atlas cedar, juniper, and a few other species grow rather well under such conditions, depending on the region.

The same terracing (trenching) technique has been used for other purposes. For example, we visited hilly territory near Azrou and El Hajeb. It had been long overgrazed and was badly eroded. By arrangement with the tribal owners, government foresters were demonstrating what could be done. The slopes had been terraced and fruit trees planted—such as apricots, figs, almonds, and olives. Pines, cedar, holly oak, etc. were also growing successfully — demonstrating that by proper culture the tribes could have fuel as well as food trees. The density of planting by this method depends on the rainfall and the ultimate size to which the trees will be allowed to grow. The terracing method requires arduous hand labor at present, but holds great promise. In some areas, however, one gets the impression that the "forests" consist of little more than hope and a few roads, and can never be much better.



Sunday morning in Casablanca: sleeping Arab finds hospitality on a horticultural doorstep.

Over-all View

The Arabs and Berbers are so busy scratching for a living in a country that is already overpopulated for an agricultural economy—especially in terms of water supply—that they apparently have neither time nor energy for esthetic expressions in life. There are plant fences around many dwellings, as in other countries with primitive native civilizations, but gardening with ornamental plants is for them unknown. The Europeans in Morocco have planted ornamentals, and their public parks and gardens are attractively worked out. The Arabs and Berbers sit in the botanic gardens and parks and seem to enjoy the beauty, but know the name of not a single plant—nor do they attempt to grow ornamental plants in gardens of their own. Growing wild in their country are some of the loveliest plants in the world.

FIFTY BETTER GROUND COVERS

*Choose the best one for your needs
from this list*

Donald Wyman

Condensed from *Arnoldia*, May 21, 1954

SOME young gardeners hope to find a "good substitute for grass," thinking, no doubt, that there must be some plant that will look as well, grow as well, and withstand the abuse as well as grass, without requiring the care given most lawns. Of course there is no such plant. Even ground covers need some attention occasionally, and those that need no cutting or pruning or fertilizing differ from a grass cover in that they may grow considerably taller or cannot be walked on.

Even though these plants will not replace grass in every respect, nevertheless there are many situations where ground covers are needed. Some special purposes for which ground covers are needed might be:

1. **For shade:** There are frequently shady spots in the home landscape where grass fails to grow well. If this shade is not augmented by poor soil and competing tree roots, as is so often the case, there are some plants which will withstand shade and make a better cover for the ground than will grass.

2. **For dry soil:** Plants for poor, dry soil are usually vigorous growers that can easily become garden pests in good soil, and can quickly outgrow their garden limits. Such plants may be needed, but they should be used with caution in the general flower border.

3. **For rapid increase:** When funds are slim and space is large, plants are wanted which can be expected to grow rapidly and cover the ground.

4. **Plants less than 6 inches high:** These are wanted for the neatly kept areas, often close to the house. Sometimes they are to be walked on, but none are as serviceable in this respect as grass.

5. **Evergreen:** It is these that are most desirable for they supply a green cover over the ground the entire year. They are usually more expensive than the deciduous woody plants and perennials, and are slower in growth.

6. **Plants needing special attention:** Some of the ground covers listed die to the ground in the winter while others may become too tall over a five-year period and have to be cut to the ground occasionally. Others, like the heather, may die back in some situations or during some winters and so require a severe pruning every spring. There may be some good reason for using such plants as ground covers, but their failings should be known.

7. **Plants needing no attention:** Such plants, of course, are greatly desired, but they may grow too tall, or too rampant, or be too coarse for use in every situation.

(In the following list, the numbers to the right of the common names refer to the above categories, where each plant can easily be placed. This is merely a rough grouping of possible uses to aid the inexperienced gardener in making his first list from which to choose a ground cover for some particular situation.)

<i>Scientific Name</i>	<i>Height</i>	<i>Common Name</i>
<i>Aegopodium podagraria</i>	14"	Goutweed, 1, 2, 3, 7
<i>Ajuga reptans</i>	3"	Carpet Bugle, 1, 3, 4
<i>Akebia quinata</i>	Vine	Akebia, 3, 4, 7
<i>Arctostaphylos uva-ursi</i>	4"	Bearberry, 2, 4, 5, 7
<i>Calluna vulgaris</i>	10"	Heather, 5, 6
<i>Cerastium tomentosum</i>	6"	Snow-in-summer, 3, 4
<i>Convallaria majalis</i>	6"	Lily-of-the-valley, 1, 3, 4, 7
<i>Cotoneaster horizontalis</i>	36"	Rock Spray, 7
<i>Cytisus purpureus</i>	18"	Purple Broom, 2, 7
<i>Diervilla lonicera</i>	36"	Dwarf Bush-honeysuckle, 3, 7
<i>Epimedium grandiflorum</i>	9"	Longspur Epimedium, 1, 6
<i>Euonymus fortunei colorata</i>	3"	Purpleleaf Wintercreeper, 1, 3, 4, 5, 6
" " <i>kewensis</i>	3"	Kew Wintercreeper, 1, 4, 5, 6
" " <i>minima</i>	3"	Baby Wintercreeper, 1, 4, 5, 6
<i>Forsythia "Arnold Dwarf"</i>	36"	Arnold Dwarf Forsythia, 1, 3, 7
<i>Gaultheria procumbens</i>	4"	Checkerberry or Wintergreen, 1, 2, 4, 5
<i>Gypsophila repens rosea</i>	6"	Rosy Creeping Gypsophila, 4, 7
<i>Hedera helix</i>	Vine	English Ivy, 1, 3, 4, 5, 7
<i>Hosta</i> sp.	12"	Plantain-lily, 1, 2, 7
<i>Hypericum bucklei</i>	12"	Blue Ridge St. Johnswort, 7
<i>Iberis sempervirens "White Gem"</i>	12"	White Gem Evergreen Candytuft, 5, 7
<i>Indigofera incarnata alba</i>	24"	White Chinese Indigo, 3, 6
" <i>kirilowi</i>	48"	Kirilow Indigo, 3, 6
<i>Juniperus horizontalis</i>	6-12"	Creeping Juniper, 4, 5, 7
" " <i>plumosa</i>	12"	Andorra Juniper, 5, 7
" <i>chinensis sargentii</i>	6-12"	Sargent Juniper, 4, 5, 7
<i>Leucothoe catesbaei</i>	36"+	Drooping Leucothoe, 5, 7
<i>Liriope spicata</i>	8"	Creeping Liriope, 1, 3, 5, 7
<i>Leiophyllum buxifolium</i>	24"	Box Sandmyrtle, 5, 7
<i>Lonicera japonica halliana</i>	Vine	Halls Japanese Honeysuckle, 3, 7
" <i>henryi</i>	Vine	Henry Honeysuckle, 3, 7
<i>Lysimachia nummularia</i>	2"	Moneywort, 1, 3, 4
<i>Nepeta hederacea</i>	4"	Ground Ivy (Gill-over-the-ground) 1, 2, 3, 4, 7
<i>Pachistima canbyi</i>	12"	Canby Pachistima, 5, 7
<i>Pachysandra terminalis</i>	12"	Japanese Spurge, 1, 3, 5, 6
<i>Parthenocissus quinquefolia</i>	Vine	Virginia Creeper, 2, 3, 7
<i>Phlox subulata "Emerald Cushion"</i>	6"	Emerald Cushion Moss Pink, 4, 7
<i>Phalaris arundinacea picta</i>	18"	Ribbon Grass, 2, 3, 7
<i>Polygonum Reynoutria</i>	18"	Dwarf Lace Plant, 2, 3, 6, 7
<i>Rhus aromatica</i>	36"	Fragrant Sumac, 2, 3, 7
<i>Rosa "Max Graf"</i>	36"	Max Graf Rose, 3
" <i>wichuraiana</i>	6"	Memorial Rose, 3, 7
<i>Saponaria ocyroides</i>	3"	Rock Soapwort, 1, 2, 4, 7
<i>Sasa variegata</i>	36"	Variegated Bamboo, 1, 2, 3, 7
<i>Sedum species</i>	5"	Stonecrop, 2, 3, 4, 6
<i>Teucrium chamaedrys</i>	12"	Chamaedrys Germander, 6
<i>Vaccinium angustifolium laevifolium</i>	8"	Lowbush Blueberry, 1, 7
<i>Veronica officinalis</i>	18"	Drug Speedwell, 1, 3, 7
<i>Vinea minor</i>	3"	Periwinkle or Myrtle, 1, 3, 4, 5, 7
<i>Xanthorhiza simplicissima</i>	24"	Yellowroot, 1, 3, 7

FASCIATION

A curious growth phenomenon that results in ribbon-like stems and multiple flowers

S. Challenger

Condensed from *Gardening Illustrated*, June, 1954
With added illustrations

MOST gardeners have seen examples of the type of abnormal growth known as fasciation. In place of the normal round stem a flattened, ribbon-like growth is produced. The growing tip of the stem, instead of being conical, becomes rather comb-like, and may give rise to twisted growths due to unequal growth of the two sides. This abnormality is not restricted to the stems, but affects the leaves, flowers, fruits, and roots.

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Found in Many Kinds of Plants

Fasciation is quite widespread in both wild and cultivated plants. It seems rarer among water plants, and conversely, more common in drought-resisting types. Many cacti and other succulents owe their commercial value to this unusual growth.

The families in which fasciation commonly occurs include the sunflower (*Compositae*), stonecrop (*Crassulaceae*), cactus (*Cactaceae*), spurge (*Euphorbiaceae*),

Fasciated twigs of cryptomeria (branchlets show normal growth)

Buhle





Some varieties of plants, such as cocksecomb, owe their horticultural value to inherent tendency toward fasciation.



Buhle photos

Fasciation may result in multiple branching, as in this form of cocksecomb, instead of broad, flattened form.

buttercup (*Ranunculaceae*), and lily (*Liliaceae*). Amongst trees and shrubs on which it has been seen are wisteria, maples (*Acer*), tree-of-heaven (*Ailanthus*)—particularly when hard-pruned—memorial rose (*Rosa wichuraiana*), and several daphne species.

Many different forms other than the common ribbon-like growth result from fasciation. In the stem the modifications which result are normally forking, two-, three-, four-fold, or even multiple. Ring fasciations, in which a cylinder is produced, are rare but have occurred on the dandelion (*Taraxacum*). In plants which form rosettes, the crown of the rosette is elongated in fasciated forms. The forking is occasionally a varietal feature, and for example, in the black currant MALVERN CROSS a single fork arising from a stem internode is common. The resulting growth is quite normal; but in winter daphne (*Daphne odora*), where a ribbon growth is produced, many of the terminal buds resulting are abnormal and die out in the second year. White winter daphne (*D. odora* var. *alba*) is so inherently liable to fasciation that it is a poor garden plant.

Fasciated Flowers

Where fasciation occurs in flowers, they either become fan-shaped, as in the cocksecomb (*Celosia argentea* var. *cristata*), or increase the number of flower stalks, as in "*Celosia plumosa*,"* and all gradations exist between the two. Alterations in the number of floral parts, giving petals and sepals of unusual number also occur. The large flat fruits of some strawberries owe their origin to fasciation. In tomatoes the influence of variety is quite considerable. The tomato POTENTATE probably produces the most fasciated fruits among English varieties, but the American variety BEEF-HEART averages from 11 to 13 seed-cavities, and has been recorded with the fantastic number of 215 seed-cavities! (The normal number is two.)

Composite flowers are very liable to fasciation, and most people have seen abnormal daisies with several heads apparently united together. Chrysanthemums

*A commonly used but technically incorrect name for the feathery form of cocksecomb.



This flat, ribbon-like stem of rose is a typical example of fasciation.



Multi-flowered tulip is another product of fasciation.

The artistic twist displayed by this cryptomeria is due entirely to fasciation.



may produce distorted heads, rather like a small boy with a "double crown" and the resulting unruly head of hair. When the florets are stripped from the disc, fasciation is seen to be the cause.

Three Types

In many cases the cause of fasciation is not known, but those which have been thoroughly investigated fall into three broad groups: genetic causes, where the abnormality is inherited; those due to environmental conditions and pest and disease attack; and those which have been induced artificially. Fasciated plants can sometimes be propagated by cuttings, but this is not always so. Cockscorn, tomato, and fasciate forms of snapdragon (*Antirrhinum*), annual phlox (*Phlox drummondii*), and tobacco (*Nicotiana*) are typical examples of inherited fasciation, breeding true. Where the abnormality has been caused by environmental conditions,



A succulent species of euphorbia (*Euphorbia lactea*)



Fasciate variety of the same species of euphorbia

it is most prevalent during active growing periods, and becomes much less common during the winter months.

Fasciations which have been induced artificially are normally the result of damage to the growing tip of the stem, either mechanical or chemical. Hormone chemicals have caused it, and anyone who has examined the distorted and twisted growing point of a weed after hormone application cannot have failed to notice the similarity between this and fasciation. Other explanations which have been suggested as a cause for fasciation include hard winters, fluctuating growth conditions, very rich soil, and soil friction, as well as many others which are much less probable.

The basic cause of fasciation is an upset in the internal organization of growth in the plant. The factors which cause the upset in organization, and how they work, have not been adequately investigated.

Fasciation on a large scale—branch of a giant saguaro cactus (*Carnegiea gigantea*)

Buhle photos





Buhle

This beautiful park could be destroyed in a day—but required skill and many years to create.

ENCROACHMENTS

Current threats to the well-being of our arboretums, botanic gardens, and parks

John C. Wister

Excerpts from articles in *American Association of Botanical Gardens and Arboretums Newsletter*, July and October, 1954

A NOTE concerning the new highway which is going through part of the Arboretum of the University of Washington, coming as it does with a similar note from the Hoyt Arboretum in Portland, calls to mind a threat which constantly hangs over the arboretums and parks of this country. The tremendous need for and demand for modern highways is understood by all. It seems that highway engineers sometimes deliberately go through parks or arboretums because neither the land nor damages have to be paid for, or because damages that have to be paid out will be less than if they have to go through residential districts.

While none of us wish to see private property destroyed by such highways, it does seem that temporary damage to a

few individuals might be a less serious matter than the long-time damage to arboretums, some of which have plantings half a century or more old, which have to be destroyed, and which it will take another half century or more to restore if they can be restored at all.

More Public Interest Needed

This whole problem reflects the fact that we in this country who are interested in arboretums, in parks, or in the natural beauty of the landscape, have not been able to make our influence felt among enough people so that there is any public appreciation of beauty or any public desire to protect what is left of our natural landscape and our natural trees, shrubs, wild flowers, and wild life.

Published by the American Association of Botanical Gardens and Arboretums

College Arboretums

Arboretums and botanical gardens belonging to colleges have a threat which comes from almost similar reasons, the need for more parking areas and the placing of new buildings. Such additions to college facilities cannot be avoided, but often the authorities place them without any particular reference to the trees or other plants which have been there for many years, and the destruction of which could often be avoided by an alternate plan.

City Parks

In a similar way nearly all city parks are threatened with loss of land by new streets or by the placing of schools or other public buildings on park property simply because the city can put them there without having to buy additional land or pay big damages. More than a quarter of a century ago, a member of the firm of Olmsted Brothers stated publicly that if all the statues or public buildings which had been proposed for Central Park, New York, had been placed in it, there would be no land left for trees or grass.

Ornamental Horticulture Being Elbowed Aside?

I should also like to point out a danger of a different kind, one which is difficult to present. It is the danger coming from the increasing complexities of the botanical sciences which absorb attention to such a degree that little time and little attention can be spared for the living plants and their horticultural problems and horticultural uses.

Botanical gardens, as the name indicates, have been established for botanical purposes. Often, however, a large part of the money has been given by people who are not botanists at all, but who are interested in horticulture, in gardening, in conservation, in the beauty of nature, etc. Even in these gardens botany is assumed to be more important than horticulture. There are more botanists on the staff than there are horticulturists. It is

natural therefore that the emphasis is on botany and particularly on its more technical aspects. This work is performed in the laboratory with a microscope rather than on the grounds with the plants which had been what interested many donors to the gardens.

In the case of arboretums this tendency is especially marked. Most arboretums have been established specifically because people wanted outdoor collections of trees and shrubs.

As time has gone on, there has been noted a tendency in universities with which arboretums or botanical gardens are connected, to become more technical and less interested in the aspects of plants which appeal to the general public. As a result of this, one famous director is known to have warned the donor of a new arboretum to appoint as trustees an independent group of men rather than a college or university. This advice expressed his fear of the university practice of diverting funds from the care of outdoor plants to the salaries of professors in the research laboratories.

I feel that horticulturists, as a group, have been greatly at fault in not asserting themselves more aggressively, or loudly, when they have seen horticulture slighted as it has been in many well-known arboretums and botanical gardens across the country.

Horticulturists as a group, and horticulturists as individuals, should, I believe, be on their toes to see that every park, every arboretum, every botanical garden, should be well kept from a horticultural point of view. They should insist that the plantings should have, wherever possible, some ecological relationship and that they should be harmonious and pleasing to the eye. It should be their desire to make every planting so beautiful as to be a source of inspiration to those who visit it, rather than merely a place where one tree after another has a label on it for the education of the taxonomist.



Our Garden Heritage

A short history of horticulture on the northeastern seaboard

Mary Deputy Cattell

Sketches by Peter K. Nelson

The garden heritage of the northeastern United States is a rich one. In the four hundred and sixty years since Columbus, this relatively small section of the world has drawn on plants from every continent, and sent its own native plants to enrich

the horticulture of almost all garden-minded nations. Our weather may be unpredictable and often unkind, but in it plants from gentler climates flourish and bring to our gardens diversity and interest.

INDIAN GARDENS

THE early gardens of America were, of course, those of the Indians. Of the tribes in this country, some of the northeastern Indians, chiefly the Senecas and the Iroquois, were considered excellent husbandmen. The records of their horticulture are rather fragmentary, largely from explorers, adventurers, and missionaries. These men came to an untamed land and wrote journals or letters to their friends, or reports to the individual sponsor or the company that sent them out. Present-day statements to stockholders are pale and dull columns of figures compared with the often extravagant and lengthy reports to the capitalists of England, France, and Holland.

The pattern of agriculture or horticulture in the New World followed that of almost all primitive civilizations. While the tribes were completely nomadic, there was, of course, very little cultivation of the land. In this section of the country the Indians were slow to take up growing their own crops because the abundance of game and fish in many places

made vegetables less necessary in the diet. The great areas full of wild fruit made the cultivation of fruit relatively unimportant. As the tribes settled down for at least part of each year, each had its own small vegetable patch. It was usually in a clearing, partially made by wind or fire, and further prepared with great labor by the men of the tribe, ready for the women to do the gardening. Since making such clearings was a long and tedious job, they were usually rather small and planted with great economy of space. Some of the tribes enclosed them with rough fences, usually of slender saplings woven together with willow strands, or occasionally of trees partially cut and bent over to form a tight fence against marauding animals. The sapling fence was by far the commonest, and interestingly enough, was very similar to the ones used in ancient European and Asiatic civilizations to protect their garden crops.

Vegetables. In these small clearings the vegetables most commonly cultivated

were corn, beans, squashes, pumpkins, Jerusalem artichokes, leeks, gourds, and tobacco. Most of these plants had come from the South American continent where horticulture was in a much more advanced state several centuries earlier. By the sixteenth century our northeastern Indians had all of these plants as staple articles in their diet, or for medicines or other tribal use. Corn and beans were certainly the most important articles of the diet. The Seneca had more than a dozen varieties of corn and was wise enough to know that the strain could be kept pure only by separating the plantings from each other. Most of the corn was field corn, although there are some records indicating the planting of sweet corn. The Seneca also had ten or more varieties of beans. The Indians' usual way of growing these vegetables is the one still practiced by many farmers in this part of the country. The corn was planted in hills and when it was well up, pole beans (either green or lima) were planted around the corn, which acted as a bean pole. Between these hills of corn and beans, the Indians—again like our present-day farmers—grew squashes, pumpkins, and gourds. One thing noticeable about all of these crops is that they store well for the winter, either by being placed in pits in the ground or by being dried and kept in baskets or other receptacles.

Jerusalem artichokes (*Helianthus tuberosus*) took the place of potatoes for the Indians and for the early settlers. There were a few sweet potatoes grown, according to later records; but all early indications are that the white potato, now familiar to this part of the country, was not grown until well into the eighteenth century. The wide variety of gourds and squashes and pumpkins was a constant surprise to the first observers of Indian horticulture. The Indians apparently had most of the present kinds of summer squashes but very few of the winter ones. The pumpkins were larger than any that most of the European explorers had ever seen, and gourds were almost unlimited in size and variety.

The sections in which tobacco could be grown were more restricted than those for any of the other crops, but just as today, the Connecticut area had its cultivation well in hand very early. It was apparently popular enough to be tried as far north as Albany and Maine, but for the most part without any great success.

The **one flower** cultivated by the Indians (not for its beauty, but entirely for its usefulness) was the sunflower. It is of South American origin and was planted in their gardens primarily for the seeds. These were eaten as they grew or were dried or pounded into a sort of cake. Oil from the seeds was popular for greasing the hair. Occasionally the leaves of the sunflower were used for smoking, where tobacco would not grow.

Fruits. The northeastern part of the country is a natural orchard, and so the Indians felt no necessity to include fruit in their cultivated gardens. Wild plum and wild cherry were main articles of their diet. As early as 1534, the northern Indians were making prunes from the plums. Again it was a question of winter storage. Anyone who has found a small patch of wild strawberries or a few straggling bushes of wild raspberries is inclined to envy the Indians their abundance of these delectable fruits. Mulberries were native in many parts of the country and were a great favorite. Early records show that most of the tribes had far greater familiarity with native plants than most of us have today. There were some sixty-five or seventy plants known to be constantly used for food, for medicine, for dye, for smoking, or for making the necessary baskets, mats, and other utensils. Apparently most of them were used wherever they were found, but there is indication that native plums were planted around the Indian villages for protection for the gardens or to give shade in the village. Probably also, where particularly good stands of the native plants were discovered, a certain amount of help was given by clearing away less useful specimens to give the valuable plants a better chance than nature did.

Soil. As the intensive cultivation of their garden plants wore out the soil, the Indians usually cleared a new area or found a new native stand of the plant they wanted, rather than trying to bring back exhausted soil. Fish buried in the corn hills is the only fertilization recorded, and so even virgin soil was quickly exhausted.

As white men pushed farther and far-

ther into the Indian settlements, they introduced two fruits which the Indians found enormously useful. The early missionaries brought seeds of peaches and apples. The peach was a great favorite and was grown in quantity by many of the tribes, where the climate allowed. There are still parts of the country where small wild red-skinned peaches are called Indian peaches. These are probably descendants of these early kinds.



GARDENS OF THE 17TH CENTURY SETTLERS

The colonists of the seventeenth century were amazed at the profusion of vegetables and wild fruits in the New World and certainly grew in their gardens almost exactly the same ones the Indians had found profitable and useful.

In addition, the early settlers brought with them, even in the crowded ships, seeds, roots, and cuttings of their familiar garden vegetables, herbs, and flowers. Coming from England by way of Holland or directly from Holland, most of them had a background of gardening which they promptly put to use in their new surroundings.

New England Colonies. The nineteen families of the Mayflower were allotted "Garden Plotes" built along both sides of what is now Leyden Street in Plymouth. As far north as Maine there were gardens planted in 1603, although the rec-

ords of their contents are too fragmentary to be valuable. The Salem colony, having a rich virgin soil, was energetic in horticultural pursuits. Fruits, vegetables, and herbs were their chief concern. The early governors, Winthrop and Endicott, are reputed to have been notable gardeners almost from the year the colony was established. They had what may be considered the first nurseries in this country. These were not true commercial nurseries, as most of the plants seemed to be for exchange or for gifts to friends; but they were astonishingly successful in growing seedling and named varieties of apples, pears, and peaches from the Old World. By 1630 there is mention both in New England and in New Amsterdam of turnips, parsnips, carrots, and radishes in addition to the local vegetables. These early gardens were necessarily largely

utilitarian, but with their Old World heritage they had some familiar old-fashioned flowers even in the rigorous days of the early seventeenth century.

Every homestead had its orchard, and by the end of the seventeenth century the orchards included not only the native fruits but the following imported from Europe:

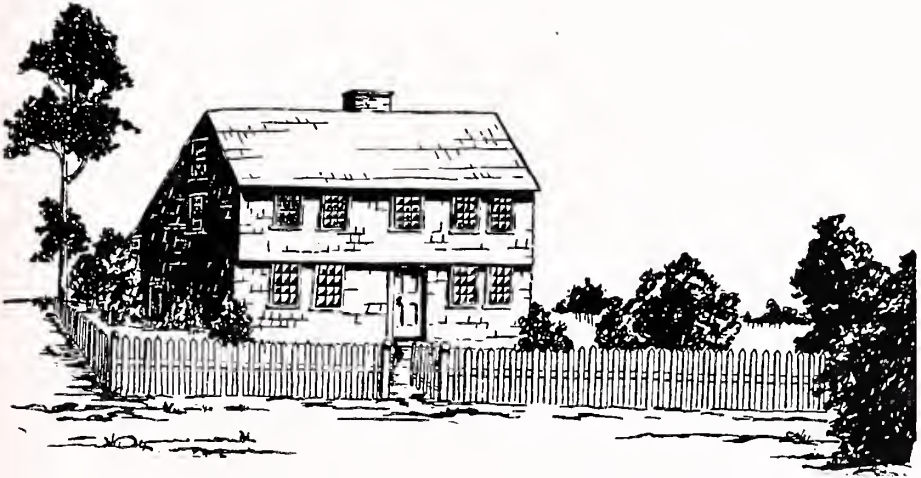
apples (*Malus*)
pears (*Pyrus*)
peaches (*Prunus persica*)
apricots (*Prunus armeniaca*)
currants (*Ribes*)
gooseberries (*Ribes*)
quinces (*Cydonia*)

By the last quarter of the century, the list of vegetables had come to include most of the ones we have in our gardens today. Wheat, rye, barley, and oats were being cultivated in larger fields, and most of the herbs familiar to cooks today were

in the kitchen garden. Among the plants giving color to the garden (many being used for medicinal purposes as well) were:

marigolds (*Calendula*)
lavender-cotton (*Santolina*)
honesty (*Lunaria*)
pinks (*Dianthus*)
lavender (*Lavandula*)
gilliflowers (*Mathiola* or *Cheiranthus*)
hollyhocks (*Althaea rosea*)
iris (*Iris*)
tansy (*Tanacetum*)
peonies (*Paeonia*)
feverfew (*Chrysanthemum parthenium*)

European garden roses had been introduced and the native wild roses transplanted to form hedges and specimens around the houses. Tulips (*Tulipa*), crown imperial (*Fritillaria imperialis*), lilies, and narcissus had been brought from Holland, and native lilies grew in profusion in the gardens.



LATER COLONIAL GARDENS

Design. By the early part of the eighteenth century, the design of the grounds was quite standardized in various colonies. Usually some kind of enclosure was necessary to keep out the cows and pigs that wandered at will in the villages. In some sections, this barrier was of stones

piled up from clearing the land. In others, it was wood fences of post and rail construction, or worm fences, or a combination of stone with rails across the top, familiar in the Hudson River country as the stake-and-rider fence. Many of the gardens were a combination of

vegetables and flowers, as they were in England. Others were essentially herb and flower gardens.

English garden books and herbals of the period gave explicit instructions for the layout and planting of the forecourt or front-yard garden, and these were a favorite type in New England. The houses were usually fairly close to the street, and the front yard was usually specially bounded from the street to the house corners. After the earlier fences of split rails came those of rough-hewn boards, changing later to the picket fence or a brick or stone wall. Along the walk from the gate to the front door were flowers chosen from those that would stand a little trampling, according to the English directions—pinks, sedums, thyme, or one of the native ground covers. The rest of the yard might be completely given over to perennials, bulbs, and herbs, with shrubs planted singly on either side of the gate, by the door, and at the house corners. In larger front yards, paths of oyster shells, flat stones, or brick made a geometric pattern of squares and rectangles. There was an invariable orderliness and primness to these gardens, although elaboration of design and intricate pattern was not common until well into the eighteenth century.

As the colonies grew and prospered, larger houses were built in the New England towns by the more successful citizens. There was lively rivalry, not only between estate owners, but even between English and American gardeners and botanists in the exchange of seeds and plants.

Commerce in plants. Considering the length of time the voyage took between the Old World and the New, the variety and quantity of plant material that went back and forth is astonishing. Here and there in old journals or orders are directions for the packing and care of plants—sometimes in boxes, sometimes in kegs, to be watered and cared for by the ship's captain and crew. Certain captains were famous for taking particularly good care of the plants and getting them safely to their destinations.

Throughout the eighteenth century, the **layout of the grounds** (whether around a town house or on the estate of a big landholder) was definitely formal in character. Fruit trees were used as decorations in *allees* and avenues. In the areas of Dutch inheritance there was a great deal of elaborate topiary work, and sundials were often seen; and both the English and the Dutch used urns and garden figures and special garden furniture. The newspapers carried advertisements of builders who offered to design pergolas, garden rooms, pavilions, and greenhouses, in an astonishing list of styles and nationalities. Almost every large estate had some form of orangery or at least a conservatory. Although these hothouses were usually small and poorly heated, exotic and tender tropical materials, so popular abroad at that time, were constantly imported. Gardening was limited almost entirely, however, to the towns and big estates. The owners of the small holdings farther out in the wilderness had no money and no leisure for more than the absolute essentials of life. The vegetables they grew were the easy ones of the early settlers of this country and their fruits came almost entirely from the wilds.

Herbs were a subject of great interest, largely through necessity. Sage (*Salvia officinalis*) was probably one of the earliest introduced, but the following were all found in the well-planted garden:

- mints (*Mentha*)
- fennel (*Foeniculum*)
- pot-marjoram (*Majorana onites*)
- sweet marjoram (*Majorana hortensis*)
- caraway (*Carum*)
- dill (*Anethum*)
- basil (*Ocimum*)
- lavender (*Lavandula*)
- rosemary (*Rosmarinus*)
- tarragon (*Artemisia dracunculus*)
- summer savory (*Satureia hortensis*)
- winter savory (*Satureia montana*)
- thyme (*Thymus*)

From the wild, witch-hazel (*Hamamelis*) was cut to make hamamelin; sassafras roots were dug for the spring tonic. Other native herbs were used for cooking and for medicine. Many of our most familiar

garden flowers were undoubtedly part of the medical supply of the housewife of that period.

Great interest in the native plant material was manifested, and it was constantly transplanted as decoration around the new homes. Three famous botanists of the century are a source of information on the woody plants most popular at the time. Cucumber magnolia (*M. acuminata*) and the evergreen magnolia (*M. grandiflora*) were both planted around the homes in the sections where they were hardy. Among the trees which were well grown here and of which seeds and plants were sent to England were:

hawthorns (*Crataegus*)
mulberries (*Morus*)
dogwoods (*Cornus*)
native plums (*Prunus*)
native cherries (*Prunus*)
mountain-ash (*Sorbus*)
sweet gum (*Liquidambar*)
black locust (*Robinia*)

In return, in addition to all the fruit varieties that were imported, the follow-

ing were at least introduced here, some of them in plentiful supply:

osier willow (*Salix viminalis*)
Norway maple (*Acer platanoides*)
European horse-chestnut (*Aesculus*)
Lombardy poplar (*Populus nigra* var. *italica*)
tree-of-heaven (*Ailanthus*)
tulip-tree (*Liriodendron*)

Lilacs (*Syringa*), both the common and the Persian, were favorites and were near almost every house.

There is less information as to the exact varieties or descriptions of the flower seeds and bulbs sent over or offered for sale here. Many of the advertisements list vegetables and trees at great length and then have a phrase at the end "divers flower seeds" or "curious flower seeds" or "useful flower seeds," with no further description. Of the bulbs, Holland was supplying crocuses, narcissus, fritillarias, anemones, ranunculus, lilies, and tulips in many varieties, and receiving in return our native lilies, of which the Turks-cap (*Lilium superbum*) was particularly popular.



GARDENING IN THE 18TH AND 19TH CENTURIES

Through the eighteenth century and the first quarter of the nineteenth century, the design of small gardens or town houses is as appropriate for today as it was for its own period. There were fre-

quently paved terraces or covered shelters where the owner could actually enjoy the garden. Most of the walks were surfaced with gravel, brick, or stone. Where the garden itself was more elabo-

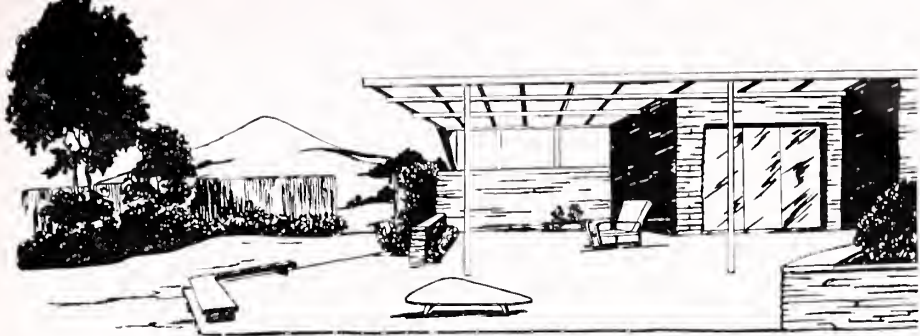
rate in curves and line than in the rectangles of Colonial days, the upkeep was no more difficult, in that ground covers were used over the spring bulbs, perennials had become more and more popular, and there was comparatively little grass to be taken care of. Where there were lawns, they were usually spacious and frequently grazed by sheep or cows. They belonged almost entirely to the large estates.

As the new century began, the influence of the English style of naturalistic gardening began to take hold in this country. Fortunately, we escaped some of the excesses of the early eighteenth century in England, when Kent and Capability Brown tore out many fine old formal gardens, built fake ruins, and imitated nature blindly but not soundly. Repton's books were apparently well known here and his combining of formal and informal layout had great influence on many of the estates by the middle of the century. The English appreciation of rolling meadows and spacious views showed in the design of fine places in New York and near Philadelphia and Wilmington. Most of these places had formal areas for the kitchen gardens, orchards, and flower gardens, but the artificiality of the early Dutch style was tempered by the new appreciation of nature and natural landscapes.

All the town gardens had enclosures of well-designed and beautiful fences or of brick or stone walls. Enclosure had come to be less of a necessity on account of straying animals but desirable in itself for seclusion, peace, and privacy in the garden. Early in the century, landscape gardeners were imported from Europe and designed some handsome places near Philadelphia and along the Hudson. Curiously enough, two or three of the best and earliest ones were French and brought with them formal design and excellent proportions. Their influence softened the impact of both overelaboration and overnaturalization which came in towards the middle of the century. By the time of the Civil War, communications

were easier between all of the Old World and the New World. New plants were constantly being introduced, brought back by ship captains as slips or seeds from the Orient, from the South Pacific, and from Europe. In addition to the larger towns and the big estates, there were more small villages, more small landowners who wanted gardens of one kind or another and were interested in plant material. Unfortunately, they were frequently interested in plant material for itself alone regardless of its appropriateness, its usefulness, or its beauty.

As in architecture and in interior decoration, the period from 1860 to about 1910 was one of great elaboration, expensiveness, and for the most part, not too much taste. Just as the interior had too much stuffing in the furniture and the exterior of the houses had wooden gingerbread, the grounds had too many plants, of too many colors, in too many places. Whether on the big estates or in the small village gardens, there were likely to be collections of one-of-a-kind plants with no feeling for arrangement or design; too many ugly ornaments, usually of cast iron; and the general feeling of a show place rather than a living area. The big contribution of the nineteenth century was its wealth of plants from all over the world and of new varieties of old plants. It was a century of exportation and importation of plant material and horticultural knowledge, of plant breeding and collection. It contributed immeasurably to the beauty of present-day American gardens in increasing the list of plants. It also went a long way in improving purely utilitarian considerations like fertilizers, tools, and general agricultural and horticultural procedures. It is quite possible that at a longer-range viewpoint the amalgam of French, Spanish, Italian, Chinese, Gothic, Greek Revival, and English influences may be seen to have made a contribution to design, even though at the present time we regard it as a rather hideous hodgepodge instead of a striving towards a new style.



20TH CENTURY GARDENING

American style. The twentieth century finds a definite style of American garden beginning to emerge. Even the connotation of the word has changed. In the early centuries, garden usually meant vegetable garden. In the late eighteenth and nineteenth, it meant the formal flower garden. Today, it designates the entire small property or the area near the house on the larger estate or farm. This has come about partly from a realization that an over-all plan of the whole place is the only possible way of getting the beauty and usefulness we desire.

The families of today are building smaller houses, and as a matter of room as well as preference, carry on more of their life outside the four walls of the house. There must be areas planned for dining, playing, relaxing, working, and entertaining through many months of the year in this part of the country; these must be as efficiently planned and as attractive as comparable areas inside. Houses are also much more closely connected to the outdoors, with larger windows and more doors; and gardens have far greater visibility at all seasons of the year. We also have considerably more of a maintenance problem than in the days when gardeners were plentiful and fairly well trained. The places must be planned so that upkeep is at a minimum and can be done either with no outside help at all or at the best with unskilled day labor.

The **covered porch or piazza** has long been an American innovation, scarcely even seen in Europe. Most of our present-day houses have moved these porches from the street side to the garden side and translated them into roofed and screened

porches or covered terraces of considerable size. As the climate permits, they have been replaced by open terraces shaded by fine trees.

Ease of transportation has, of course, increased the truck farming of the country, making the individual owner's vegetable garden less important. Most new homeowners feel they must have a vegetable garden for the first year or two. Usually they find it an unprofitable and time-consuming undertaking and turn their garden activities to some other field. Large elaborate and unrelated formal flower gardens are certainly on the wane. They take skill, time, and money to maintain, and present-day designers are finding ways of satisfying the desire for flowers without giving too much area to them. Walls, fences, and other architectural enclosures and adjuncts are increasingly popular and are replacing the laboriously trimmed hedges and jungle shrub borders of the early part of the century.

It is gratifying that with far greater wealth of fine plant material than we have ever known before, we are using on individual places plants fewer in number but of much finer quality. Our houses are more likely to have two or three interesting sculptured specimens near them than they are to be smothered in a feather-bed of assorted evergreens. Each plant, whether woody, or herbaceous, is considered for its essential place in the design as a whole, rather than for its own sake. Simplification for maintenance, and appropriateness to today's houses and way of living, fortunately result in more restful and more livable grounds, increasingly satisfying and of individual style.



WORTH READING

A SELECTED LIST OF RECENT
NONTECHNICAL BOOKS, MAGAZINE ARTICLES
AND EXPERIMENT STATION BULLETINS

General

THE HIDDEN LIFE OF FLOWERS, by J. M. Guileher. Published by the Philosophical Press, New York, 1954. 93 pages, \$4.75.

The story of birth, life, and death of the plant told in superb photographs, with clearly written text translated from the French.

PHOTOGRAPHING YOUR FLOWERS, by John P. Roche and Mary Alice Roche. Published by Greenberg, New York, 1954. 152 pages, \$3.75.

A complete guide for the gardener who wants to capture his prize blooms with the camera; numerous fine illustrations.

THE GIANT CACTUS FOREST AND ITS WORLD, by Paul Griswold Howes. Published by Duell, Sloan, and Pearce, New York and Little, Brown, Boston, Massachusetts, 1954. 258 pages, \$7.50.

Well-written and beautifully illustrated story of the life in the deserts of the Southwest.

THE FLOWERING CACTUS, by Raymond Carlson. Published by McGraw-Hill, New York, 1954. 96 pages, \$7.00.

Descriptions of the important species of cactus found in the United States, with over 80 magnificent photographs in color and many in black and white.

ROSES, by Pierre Redouté, selected and introduced by Eva Mannering. Published by Ariel Press, British Book Center, New York, 1954. 16 pages, 24 colored plates, \$8.50.

Superb reproductions of 24 of the beautiful paintings of roses made by Redouté.

FLOWER-SHOW GUIDE, by Anne Wertsner Wood. Published by Barrows, New York, 1954. 207 pages, \$3.00.

Complete information on flower shows; exhibiting; staging; judging; sample schedules and flower show classes.

THE GOLDEN AGE OF GARDEN MAGAZINES, by Edward I. Farrington. In *Horticulture*, October, 1954. 6 pages.

Interesting histories of the great garden magazines and the men associated with them.

SOIL, by G. V. Jacks. Published by the Philosophical Library, New York, 1954. 222 pages, \$5.00.

The basic properties of soil explained in simple language; how soil is formed; how it is affected by agriculture; how it can be preserved.

WATCH OUT FOR THE TREE QUACKS, by John M. Haller. In *American Home*, November, 1954. 1 page.

Timely warning to home owners of the many false "tree experts" operating today; how to spot them; what to do about them.

LAUGHTER ON THE STAIRS, by Beverley Nichols. Published by Dutton, New York, 1954. 254 pages, \$3.75.

A light, amusing novel utilizing effectively the author's sound knowledge of landscaping, flowers, trees, and houses.

WHEN THE BULLDOZER LEAVES. In *House & Garden*, September, 1954. 3½ pages.

Unforeseen problems a bulldozer may create and how to solve them.

HOW TO DOCTOR THE CLIMATE IN YOUR GARDEN, by Leavitt Dudley. In *House Beautiful*, September, 1954. 6 pages.

The great variety of micro-climates in any lot or garden are pointed out and ways in which they may be used to advantage explained; numerous diagrams.

THE EFFECT OF PLANT MATERIAL UPON THE MICRO-CLIMATE OF HOUSE AND GARDEN, by R. B. Deering and F. A. Brooks. In *The National Horticultural Magazine*, July, 1954. 6 pages.

How plants influence temperature, moisture, and air movement, and how this knowledge may be put to practical use.



Gardening and Horticultural Practices



GARDENING, by Montague Free. Published by Doubleday, Garden City, New York, 1954. 440 pages, 50c.

Perma-book edition of this valuable and well-known garden book. Contains answers to practically all questions of beginners and a wealth of information for advanced gardeners. Illustrated.

THE CARE AND FEEDING OF GARDEN PLANTS. Published by American Society for Horticultural Science and National Fertilizer Association, Washington, D. C., 1954. 184 pages, \$3.00.

Color photos, excellent.

THE ARNOLD ARBORETUM GARDEN BOOK, by Donald Wyman. Published by Van Nostrand, New York, 1954. 354 pages, \$5.95.

A collection of over 40 issues of the Arboretum's popular bulletin *Arnoldia*, covering a wide range of subjects including propagation, shrubs, vines, pruning ornamentals. Illustrated.

OUT IN THE OPEN, by Ray M. Koon. Published by Little, Brown, Boston, Massachusetts, 1954. 239 pages, \$2.95.

A collection of articles and essays covering many garden subjects including soils, vegetables, fruits, pests.

GARDENING FOR COLOR, by William H. Clark. Published by Little, Brown, Boston, Massachusetts, 1954. 212 pages, \$2.95.

How to choose flowers whose colors harmonize and complement one another; how to provide succession of bloom; what to choose for background; how to have color even in winter gardens.

PLANT REGULATORS IN AGRICULTURE, edited by H. B. Tukey. Published by John Wiley and Sons, New York, 1954. 269 pages, \$5.50.

What plant regulators are, how they operate, where they belong in agriculture; application to specific problems.

LAWNS, by John D. Bernard. Published by Rinehart, New York, 1954. 94 pages, \$1.50.

Complete guide to starting and maintaining a good lawn.

SUNSET WESTERN GARDEN BOOK. Published by Lane, Menlo Park, California, 1954. 384 pages, \$2.95.

Profusely illustrated, encyclopedic volume covering nearly every phase of gardening in the western United States.

GARDENING IN THE LOWER SOUTH, 2nd edition, by Harold H. Hume. Published by Macmillan, New York, 1954. 377 pages, \$7.50.

Completely revised edition of this standard guide to gardening in the Lower South; new chapters on camellias and day-lilies; many new photographs.

PLANT BREEDING FOR EVERYONE, by John Y. Beaty. Published by Brandford, Boston, Massachusetts, 1954. 102 pages, \$2.75.

A useful handbook for anyone who wishes to do plant breeding as a serious vocation or merely as an interesting, enjoyable hobby.

VEGETATIVE PROPAGATION, edited by John L. Creech. *The National Horticultural Magazine*, January, 1954. 88 pages.

An entire issue of this well-known magazine devoted to authoritative, comprehensive articles on all phases of vegetative propagation.

THE PRUNING MANUAL, by Everett P. Christopher. Published by Macmillan, New York, 1954. 320 pages, \$5.00.

Based on the Pruning Manual of L. H. Bailey, this book provides comprehensive, up-to-date pruning information. Specific instruction for pruning all temperate-zone fruit and shade trees, ornamental shrubs. Numerous diagrams and photographs.

Garden Flowers and Vegetables

THE AMERICAN GARDENER'S BOOK OF BULBS, by T. H. Everett. Published by Random House, New York, 1954. 244 pages, \$5.95.

Authoritative and practical guide to bulb culture, lavishly illustrated, many color plates; has an excellent section of how-to-do-it pictures.

A VARIETY OF HARDY BULBS FOR THE SPRING FLOWER GARDEN, by H. M. Bickart. New Jersey Agricultural Experiment Station (New Brunswick, N. J.) Circular 559, June, 1954. 30 pages.

Descriptions of many hardy bulbs arranged according to season of bloom; planting; winter care; pests.

THE CULTURE OF GLADIOLUS, by R. E. Lee. New York State College of Agriculture at Cornell University (Ithaca, N. Y.) Extension Bulletin 914, March, 1954. 4 pages.

Another in a series of bulletins on culture of ornamental plants; gives complete directions for successful raising of gladiolus.

HALF CENTURY OF IRIS, by William J. McKee and Jamison R. Harrison. Published by the author, Worcester, Massachusetts, 1954. 248 pages, \$4.00.

Very complete handbook for the iris enthusiast; histories and derivation of various types, arranged according to colors.

SEQUENCE OF BLOOM OF PERENNIALS, BIENNIALS, AND BULBS, by R. E. Lee. New York State College of Agriculture at Cornell University (Ithaca, N. Y.) Miscellaneous Bulletin 21, January, 1954. 6 pages.

An elaborate table giving height, common and scientific names, color, and period of bloom of about 300 flowering plants.



Trees and Shrubs



AN INTRODUCTION TO TREES, by John Kieran. Published by Hanover House, Garden City, New York, 1954. 77 pages, \$2.95.

Guide to easy identification of trees; 100 illustrations in color.

TREES OF YOUR TOWN, by David S. Marx. Published by the Leafprinters, Loveland, Ohio, 1954. 60 pages.

Simple guide to deciduous trees commonly found in cultivation. Illustrated by prints made from actual leaves.

TREES OF THE WOODS, by David S. Marx. Published by the Leafprinters, Loveland, Ohio, 1954. 60 pages.

Simple guide to native trees; illustrated by prints made from actual leaves.

EVERGREENS, by L. L. Kumlien. Published by Rinehart, New York, 1954. 91 pages, \$1.50.

What evergreens to grow; how to propagate from seeds and cuttings; evergreens for various uses. Numerous line drawings.

SMALL FRUITS, by Ralph E. Barker. Published by Rinehart, New York, 1954. 90 pages, \$1.50.

A guide to the culture of the chief small fruits — strawberries, raspberries, blackberries, blueberries, currants, and grapes.

ANNUALS, by Ann Roe Robbins. Published by Rinehart, New York, 1954. 95 pages, \$1.50.

How to raise annuals; buying seed; when and what to plant; advantages of annuals.

DAHLIAS FOR EVERY GARDEN, by Marian C. Walker. Published by Barrows, New York, 1954. 128 pages, \$2.95.

How to plant, fertilize, and store dahlias; chapters on pest control, regional differences, growing dahlias for exhibition. Contains lists of recommended varieties and sources of supply.

SUCCULENT PLANTS OTHER THAN CACTI, by A. Bertrand. Published by The Philosophical Library, New York, 1953. 112 pages, \$4.75.

Culture, propagation, and enemies of succulents; descriptions of members of horticulturally important families of succulents. Illustrated in black and white and in color.

VEGETABLES, by Jack M. Swartout. Published by Rinehart, New York, 1954. 92 pages, \$1.50.

Tells how to grow vegetables; how to get the most out of your garden; soil management.

THE HOME FRUIT PLANTING, by M. B. Hoffman. New York State College of Agriculture at Cornell University (Ithaca, N. Y.) Extension Bulletin 913, July, 1954. 32 pages.

Discusses planning, planting, and caring for a home orchard; varieties; pruning.

THE IMPROVED NUT TREES OF AMERICA AND HOW TO GROW THEM, by Clarence A. Reed and John Davidson. Published by Devin-Adair, New York, 1954. 404 pages, \$6.00.

Detailed information on the culture of nut trees for all sections of the United States. Includes curing and marketing practice. Illustrated.

ROSES, by Roy E. Shepherd. Published by Rinehart, New York, 1954. 96 pages, \$1.50.

Fundamentals of rose culture clearly and concisely presented.

HISTORY OF THE ROSE, by Roy E. Shepherd. Published by Macmillan, New York, 1954. 264 pages, \$4.75.

Divides roses into eleven major groups; gives general characteristics of each; history of species and the derivation of hybrids within each. Illustrated.

WINTER-HARDY AZALEAS AND RHODODENDRONS, by Clement Gray Bowers. Published by Massachusetts Horticultural Society, Boston, Massachusetts, 1954. 112 pages, \$3.00.

Written for amateurs, this book with its lists of azaleas and rhododendrons hardy in the Northeastern United States fills a long-felt need.

RHODODENDRON GLORIES OF SOUTHWEST SCOTLAND, by David S. Boyer and B. A. Stewart. In *National Geographic Magazine*, May, 1954. 23 pages.

A description of some of the finest rhododendron gardens in the world, profusely illustrated in black and white and in color.



Pests and Diseases



THE GARDENER'S ABC OF PEST AND DISEASE, by A. W. Dimock. Published by Barrows, New York, 1954. 191 pages, \$2.95.

Thorough, authoritative guide to plant pests and diseases, their recognition and cure.

DISEASES OF ORNAMENTAL SHRUBS AND VINES, by L. P. Nichols. Pennsylvania State University College of Agriculture (State College, Pa.) Circular 429, March, 1954.

Fifty common ornamentals, with their most serious diseases; methods of control.

INSECT PESTS OF DECIDUOUS SHADE TREES AND THEIR CONTROL, by S. G. Gesell. Pennsylvania State University College of Agriculture (State College, Pa.) Circular 427, February, 1954. 29 pages.

General shade tree feeders; specific pests of 18 common shade trees; insecticides to use.

PLANT DISEASES IN ORCHARD, NURSERY, AND GARDEN CROPS, by Ernest Gram and Anna Weber. Published by The Philosophical Library, New York, 1953. 618 pages, \$18.50.

An encyclopedia of plant diseases for the nurseryman, market gardener, and small gardener. Thorough and authoritative, but written to be easily understood.

SMALL FRUIT DISEASES AND THEIR CONTROL, by A. W. Helton. University of Idaho College of Agriculture (Moscow, Idaho) Bulletin 219, July, 1954. 42 pages.

Discussion of symptoms and control of many small fruit diseases; new pesticides; explanation of Bordeaux mixture and lime-sulfur numbers.

GROWING EVERGREEN HOLLIES, 2nd edition, by H. Gleason Mattoon. Published by Horti-Products, Narberth, Pennsylvania, 1954. 48 pages, \$1.

Illustrated pamphlet containing cultural directions and brief descriptions of evergreen hollies. Valuable list of species and varieties to grow in each state of the United States.

GROWING CHESTNUTS FROM SEED, by Roger W. Pease. West Virginia University Agricultural Experiment Station (Morgantown, W. Va.) Circular 90, January, 1954. 9 pages.

How to collect, treat, and plant chestnuts; transplanting the seedlings; caring for the young trees.

DISEASES OF BRITISH GRASSES AND HERBAGE LEGUMES, 2nd edition, by Kathleen Sampson and J. H. Western. Published by Cambridge University Press, New York, 1954. 118 pages, \$3.00.

Technical treatment; valuable to managers of lawns and turfs.

SCALE INSECTS AND THEIR CONTROL, by J. C. Schread. Connecticut Agricultural Experiment Station (New Haven, Conn.) Bulletin 578, February, 1954. 23 pages.

How to recognize and control eight common and serious scale insect pests.

ANTS AS PESTS, by John C. Schread and Neely Turner. Connecticut Agricultural Experiment Station (New Haven, Conn.) Circular 188, May, 1954. 4 pages.

How to control ants in house, lawn, and garden.

CONTROL WHITE GRUBS IN LAWNS, by Robert E. Roselle. University of Nebraska College of Agriculture (Lincoln, Neb.) E. C. 1569, 1954. 3 pages.

Recognizing the presence of white grubs; recommended insecticides and how to use.

CHESTNUT BLIGHT AND RESISTANT CHESTNUTS. U. S. Department of Agriculture Farmers' Bulletin No. 2068, June, 1954. 21 pages, 15c.

Complete description of the disease, its effects, what measures can be taken, resistant varieties and how to grow them.

SOME COMMON DISEASES OF FLOWERING DOGWOOD IN DELAWARE, by R. S. Cox. University of Delaware Agricultural Experiment Station (Newark, Del.) Circular No. 27, March, 1954. 8 pages.

Discussion of symptoms and control of two diseases affecting dogwood.



Indoor Gardening and Flower Arrangement



EXOTIC PLANTS ILLUSTRATED, 2nd edition, by Alfred Byrd Graf. Published by Rochrs, Rutherford, New Jersey, 1954. 96 pages, \$2.50.

A catalogue containing pictures and brief descriptions of nearly 1400 exotic plants used as house plants or conservatory specimens. Includes begonias, bromeliads, orchids, ferns, succulents.

PLANTS INDOORS, by Mary Noble and J. L. Merkel. Published by Van Nostrand, New York, 1954. 219 pages, \$6.95.

Beautifully illustrated, this comprehensive book on house plants has special sections devoted to raising plants under artificial light, use of plants in office buildings and hotel lobbies, and plants of the future.

AMARYLLIS—AND HOW TO GROW THEM, by Peggie Shulz. Published by Barrows, New York, 1954. 128 pages, \$2.95.

The care of amaryllis from seed or bulb through flowering to dormancy; soils; advanced methods of propagation.

FOOT-CANDLES AND GREEN LEAVES, by O. Wesley Davidson. New Jersey Agricultural Experiment Station (New Brunswick, N. J.) Circular 558, March, 1954. 7 pages.

The use of artificial light for growing foliage plants indoors.

COLOR IN FLOWER ARRANGEMENT, by Adelaide B. Wilson. Published by Barrows, New York, 1954. 128 pages, \$5.95.

Theory of color clearly explained and applied to the art of flower arranging; 16 color plates.

HOUSE PLANTS FOR EVERY WINDOW, by Dorothy H. Jenkins and Helen Van Pelt Wilson. Published by Barrows, New York, 1954. 238 pages, \$2.95.

Revision of *Enjoy Your House Plants*. Chapters on window gardens, soils, potting, pests, gift plants; special sections deal with unusual plants, plants with fragrant flowers, how to have succession of bloom.

JUNIOR FLOWER ARRANGING, by Katherine N. Cutler. Published by Barrows, New York, 1954. 179 pages, \$2.95.

First book written for boys and girls interested in the craft of flower arranging; complete easy-to-follow directions for selecting, keeping, and exhibiting flowers.

FLOWER ARRANGEMENT WORK-BOOK 2, by Myra J. Brooks. Published by Barrows, New York, 1954. 64 pages, \$2.50.

Twelve lessons in flower arranging, slightly more advanced than those in the first book by the same author; clearly written and well illustrated.

FLOWER ARRANGEMENTS ANYONE CAN DO ANYWHERE, by Matilda Rogers. Published by Dodd, Mead, New York, 1954. 190 pages, \$2.75.

Designed for beginners, this thorough guide to flower arranging will be found useful to those with experience as well. Also available in pocket-book edition (Signet).

Wildlife and Conservation

OUR WILDLIFE LEGACY, by Durward L. Allen. Published by Funk and Wagnalls, New York, 1954. 422 pages, \$5.00.

Lively account of what is happening among the populations of birds, mammals, and fish of our countryside; clear presentation of the basic principles of wildlife conservation.

WILDFLOWERS AND HOW TO GROW THEM, by Edwin F. Steffek. Published by Crown, New York, 1954. 192 pages, \$3.95.

First complete guide to cultivation of wildflowers: soils, climate, propagation, transplanting; sections on conservation and identification.

SAVING MAN'S WILDLIFE HERITAGE, by John H. Baker. In *National Geographic Magazine*, November, 1954. 40 pages.

Beautifully illustrated story of the work of the 50-year old National Audubon Society.

THE WEB OF LIFE, by John H. Storer. Published by Devin-Adair, New York, 1953. 144 pages, \$3.00.

An introduction to ecology—the fascinating study of the interrelationships of living things to one another and their surroundings. Readably written with a section of excellent illustrations.

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CORRECTIONS:

- p. 156: legend for bottom figure, "lead pipe" should read "lead, iron, or any other available pipe."
 p. 198: legend for upper right hand figure, "Fiscus" should of course read "Ficus".
 p. 248: third paragraph, last two sentences—author intended this to read "plant set in shade to dry" (with apologies to Miss Peters).

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